EXISTING ENVIRONMENTAL CONDITIONS

I. Climate and Air Quality

Air quality is determined primarily by meteorological conditions, the type and amount of pollutants emitted, and their subsequent dispersion into the atmosphere. The quality of surface air (air quality) is evaluated by measuring ambient concentrations of pollutants that are known to have deleterious effects on public health. The degree of air quality degradation is then compared to ambient air quality standards (AAQS), such as the California and National Ambient Air Quality Standards (CAAQS and NAAQS). The Federal Clean Air Act (42 U.S.C. §§ 7401-7671q) requires the adoption of national ambient air quality standards (NAAQS) to protect the public health and welfare from the effects of air pollution. The NAAQS have been updated occasionally. Current standards are set for sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter equal to or less than 10 microns in size (PM_{10}), fine particulate matter equal to or less than 2.5 microns in size ($PM_{2.5}$), and lead (Pb)[3]. The State of California Air Resources Board (ARB) has established additional standards which are generally more restrictive than the NAAQS.

The 1990 amendments to Federal Clean Air Act Section 176 required the USEPA to promulgate rules to ensure that federal actions conform to the appropriate SIP. These rules, known together as the General Conformity Rule (40 C.F.R. §§ 51.850-.860 and 40 C.F.R. §§ 93.150-160), require any federal agency responsible for an action in a nonattainment area to determine that the action is either exempt from the General Conformity Rule's requirements or positively determine that the action conforms to the applicable SIP. In addition to the roughly thirty presumptive exemptions established and available in the General Conformity Rule, an agency may establish that emission rates would be less than specified emission rate thresholds, known as *de minimis* limits. An action is exempt from a conformity determination if an applicability analysis shows that the total direct and indirect emissions from the project will be below the applicable *de minimis* thresholds and will not be regionally significant, which is defined as representing ten percent or more of an area's emissions inventory or budget.

Ventura

Air quality in the immediate Ventura project vicinity is generally good; however, the entire southern half of Ventura County is in a non-attainment area (standards exceeded) for ozone. The standards are exceeded most often in summer months. Although standards are exceeded only a few times annually in the coastal zone, they are exceeded more frequently inland, due to pollutants carried by prevailing winds. The major source of air pollution in the project area is the automobile, followed by recreational facilities and related recreational vehicles and power boats.

San Diego

This section provides an overview of the air quality in the San Diego region. It is not necessary or possible to describe air quality at each of the specific sites. Since potential air quality impacts are addressed in terms of compliance with federal or state regulations, those regulations are discussed in this section.

The sites are located in the San Diego Air Basin (SDAB), which is contiguous with San Diego County. The climate of San Diego County is characterized by warm, dry summers and mild, wet winters. One of the main determinants of the climatology is a semi-permanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern chances, and low-pressure storms are brought into the region, causing widespread precipitation. In San Diego County, the months of heaviest precipitation are November through April, averaging about 9 to 14 inches annually. The mean temperature is 62.2ºF, and the mean maximum and mean minimum temperatures are 75.7ºF and 48.5ºF, respectively.

The Pacific High also influences the wind patterns of California. The predominant wind directions at MCAS Miramar are westerly and west-southwesterly during all four seasons, and the average annual wind speed is 5.6 mph. A common atmospheric condition known as a temperature inversion affects air quality in San Diego. During an inversion, air temperatures get warmer with increasing height rather than cooler. Subsidence inversions occur during the warmer months (May through October) as descending air associated with the Pacific high-pressure cell comes into contact with cool marine air. The boundary between the layers of air represents a temperature inversion which traps pollutants below it. The inversion layer is approximately 2,000 feet MSL during the months of May through October. However, during the winter months (November through April), the temperature inversion is approximately 3,000 feet MSL. Inversion layers are important elements of local air quality because they inhibit the dispersion of pollutants, thus resulting in a temporary degradation of air quality.

Specific geographic areas are classified as either “attainment” or “nonattainment” areas for each pollutant based upon the comparison of measured data with NAAQS and state standards. The SDAB, which is contiguous with San Diego County, currently meets the federal standards for all pollutants except O_3 and state standards for all pollutants except O_3 and PM_{10}. The SDAB is currently classified as a federal and state “serious” O_3 nonattainment area and a state nonattainment area for PM_{10}. The SDAB currently falls under a federal “maintenance plan” for CO, following a 1998 redesignation as a CO attainment area. Ambient air pollutant concentrations in the SDAB are measured at ten air quality monitoring stations operated by San Diego APCD. In the coastal area, O_3 is monitored at Camp Pendleton, Oceanside, Del Mar, and Chula Vista; PM_{10} is monitored at Oceanside and Chula Vista.

The most significant regional sources of O_3, NO_2, and CO are automobiles and other on-road vehicles. O_3 is formed by the reaction of volatile organic compounds (VOC) and oxides of nitrogen (NO_x), which are combustion products from gas and diesel engines. Other important sources of VOC are paints, coatings and process solvents. The major sources of PM_{10} are construction, demolition and dust from paved and unpaved roads.

II. Biological Resources

This section is divided into sub-sections for Terrestrial Vegetation and Wildlife, Estuarine and Marine Resources, and Threatened, Endangered, and Other Special Status Species.

2.1 Terrestrial Vegetation and Wildlife

Mammals

The sites are located near urban development and/or have bluffs. Common mammal species with the potential to occur in the vicinity of receiver sites in the project area include gophers (*Thomomys bottae sanctidiegi*), mice (e.g., *Mus musculus*), black rats (*Rattus rattus*), Norway rats (*Rattus norvegicus*), opossum (*Didelphis virginiana*), rabbits (*Sylvilagus* spp.), California ground squirrel (*Spermophilus beecheyi nudipes*), raccoon (*Procyon lotor psora*), coyote (Canis latrans), and striped skunks (*Mephitis mephitis holzneri*). None of these species are listed as threatened or endangered by the federal or state government.

Coastal Strand Habitat (Ventura)

Ventura

Typical coastal strand plant species include sea rocket (Cakile maritima), sand verbena (Abronia sp.), suncup (Camissonia cheiranthifolia), and beach ragweed (Ambrosia chamissonis). Unvegetated sand provides habitat for clams and other burrowing organisms, which in turn attract foraging shorebirds to the water's edge. Coastal strand habitat, especially dunes (discussed below), provides habitat for insects such as dune beetles, lizards, and rodents such as California squirrel (Citellus beecheyi), pocket gopher (Thomomys bottae), and mice (Peromyscus sp.).

The Ventura Port District began a revegetation program on the dunes and beach at South Beach (between the Harbor and the Santa Clara River) in 1985, in order to stabilize the sand. The seeded area includes the corridor that was used for the dredge pipeline for dredging operations prior to 1985-86. In 1985-86, the pipeline corridor was moved seaward to avoid the planting, but in 1986-87 the beach had eroded to the extent that the contractor was required to lay the pipeline in the revegetated area. This caused minor damage, which has subsequently recovered. Over the last ten years, the beach has accreted significantly, and the disposal pipeline has consistently run seaward of the dunes. Beach accretion has been particularly notable since completion of the 1994 harbor improvements project.

Sea fig (Carpobrotus chilensis), also called iceplant (a non-native species), appeared to be the most successful species used in the re-seeding program when observed in 1986. An introduced species of sea lavender (Limonium pectinatum) was also relatively successful. A lupine (Lupinus sp.) was present, however, it did not appear to be the species used in the seed mix (Lupinus arboreus). Two additional species that were not included in the seed mix, sea rocket and beach ragweed, have also become well established in the seeded area.

The dunes at McGrath State Beach, approximately one mile downcoast of the harbor, are less disturbed than the dunes at South Beach, and continue to support native species such as sand verbena (Abronia maritime and A. umbellate), suncup, and beach ragweed, as well as introduced species such as sea rocket and sea fig.

2.2 Estuarine and Marine Resources

Ventura

The habitats characteristic of the Ventura Harbor area are wetlands (salt and brackish marsh) and deepwater marine and estuarine ecosystems (as defined by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory); and coastal strand habitat of sandy beaches and dunes (as defined by Munz, 1974).

Marine habitats include natural open water and sandy bottom benthic habitats of the intertidal, nearshore, and pelagic zones, as well as rocky artificial habitats created by the jetties and breakwater. Vegetation consists of several species of green, brown and red algae (seaweeds), diatoms, and phytoplankton. Fauna include many marine invertebrates and fish. The nearshore sandy bottom is influenced by ocean swell and wave surge. The most abundant infaunal species in this area are invertebrates such as polychaete worms, anemones, and clams (Chambers Group, Inc. 1992). Natural and artificial rocky substrate supports seaweed attachment, sessile invertebrates (e.g., mollusks and barnacles), and cover and feeding areas for rock habituating fish (e.g., Garibaldi, black perch, rock wrasse) and motile invertebrates, (e.g., crab, lobster, sea stars and sea snails). Numerous marine birds and occasional marine mammals also rest and feed in the open water, intertidal and rocky marine environment.

Intertidal

Ventura

Intertidal substrate at the Oil Piers beach placement site is sand. A significant rocky intertidal area is found approximately 1,200 ft. to the west of the site at Mussel Shoals off Punta Gorda. The intertidal habitat consists mainly of large boulders and cobble. Extensive surf grass medeadows coat the rocks in the lower intertidal. Green sea anemones and California mussels are also abundant (Tway 1991).

San Diego Sites

Intertidal surveys were conducted at each of the alternative sites to map and describe habitat characteristics. Of particular interest was the occurrence of hard substrate, the relative quality of habitats, and occurrence of sensitive resources. The intertidal zone is defined as the area between the highest high tide and the lowest low tide and can be divided into three areas (upper, middle, and lower) based on the frequency and duration of inundation by seawater. The intertidal zone is also characterized by breaking surf. Shallow subtidal zone is defined as the area between the lower intertidal and the inner shelf zone. The inner shelf zone is defined as the subtidal zone between -30 feet and -80 feet MLLW.

Sites were visited during spring lower low tides so that the intertidal zone was well exposed. All sites were surveyed early morning between May 17 and May 20, 1999. Brief visits were made June 15 through 17, 1999 at selected sites to augment the description of those sites. At the time of the June 1999 visits, it was noted that there had been build up of sand on the beaches, and that some of the hard substrate areas noted in May 1999 were buried by sand. Sites where hard substrate had been noted in June were re-surveyed July 13 through 15, 1999. The re-surveyed locations included the Carlsbad and Solana Beach sites.

During the beach surveys, the distribution of sand versus hard substrate habitat within the intertidal zone was mapped. Survey teams measured the length and width of all hard substrate areas relative to distance from the northern site boundary. Photographs of representative views of the beach habitats were taken.

The depth of sand, up to a depth of four feet, was measured within upper, mid, and low intertidal zones at several locations along the beach using a one-quarter inch diameter calibrated rod. At selected locations the rod was pushed into the sand up to four feet deep or to the point of refusal (until it hit something that prevented further penetration like a rock or reef) whichever occurred first. There were at least nine sample locations at each site. The focus of the sand depth measurements was to identify occurrence of habitat for various organisms and egg laying by California grunion. Since those habitat functions typically occur within sand depths ranging up to two to three feet, depths greater than four feet were not measured.

The sand substrate was further characterized by examination of organisms living within upper, mid, and low intertidal zones. Shovel samples (up to 24 inches deep or refusal) were collected from the three intertidal zones at three locations corresponding to near the northern boundary, near the middle, and near the southern boundary of each site. The sides and interior of the holes were examined for marine organisms (e.g., grunion eggs, sand crabs, worms, clams, etc.). Sand removed from the holes was sieved through a 1 mm screen to assist the evaluation of the presence of marine organisms. The wave wash area was examined for sign of sand crabs (i.e., v-shaped antennae extended), clams, and sand dollars.

The hard substrate areas were described according to type (e.g., cobble, boulders, rock bench) and relief height. Relief was defined in a manner consistent with previous Navy documentation. Pursuant to the previous Navy documentation, low relief was defined as being less than three feet in height and high relief was defined as being greater than three feet in height (Department of the Navy 1997a, 1997b). Animals and plants living on hard substrate areas were identified consistent with the previous Navy studies, and their relative abundance was noted.

The proximity of the sites to reefs and/or kelp beds located further offshore was considered for each site because the project has the potential to result in impacts associated with increased turbidity and sediment transport.

The sites are characterized by varying combinations of sand and cobble. Sand habitat is inhabited by worms, sand crabs, crustaceans, and bean clams. Other sites have hard substrate in the form of cobbles, rock revetment, rock, or sandstone bench with various resource development. Sites in Carlsbad, elsewhere in Encinitas, and Solana Beach have sand plus cobble bands of varying

widths and density. Each of the sites is described below in terms of species and habitat identified within the receiver sites boundaries (i.e., footprint) and nearby sensitive resources. Sensitive resources are defined at the habitat level to include vegetated nearshore reefs and kelp beds, and at the species level to include protected, and/or threatened and endangered species. Nearshore habitats adjacent to the beach replenishment sites support invertebrates, fish, algae, surfgrass, kelp, mammals, and foraging birds. Communities of invertebrates and fish that inhabit the nearshore areas are determined by the type of bottom substrate (sandy or hard-substrate) and the presence of kelp or surfgrass. Nearshore habitats adjacent to the receiver sites are sandy bottom, with varying amounts of hard substrate at several of the sites. Hard substrate with surfgrass or kelp occur offshore several of the sites. Vegetated areas are functional habitats, supporting associated fishes and invertebrates.

Subtidal

Ventura

The subtidal substrate in shallow depths (8 to 15 ft.) off the Oil Piers sand placement site consisted of scattered rocks between 4 and 12 inches high at the western end. To the east, most of the shallow subtidal area was sand. At the southeastern end, the remnants of the oil piers are still there and provide some shelter for fishes and attachment for sessile invertebrates.

Some patches of kelp have been mapped southeast of the Oil Piers site (Ecoscan 1989). During the August 2000 survey, a small patch of kelp was observed in about 25 to 30 ft. of water offshore the downcoast end of this site.

San Diego Sites

Inshore surfgrass beds located between Oceanside and Torrey Pines were surveyed during extreme minus tides (-1.8 to -2.1 MLLW) on January 21 and 22, 2000. Differential Global Positioning System (DGPS) coordinates were taken at the onshore-offshore and upcoast-downcoast edges of exposed surfgrass beds. Beds were delineated by biologists and plotted using DGPS.

Surveys for nearshore reefs were conducted in areas where the model indicated the potential for more persistent sand deposition and where resources had not been mapped or where mapping identified hard substrate, but that substrate was unquantified or uncharacterized. Surveys also validated data from various sources including prior mapping performed by the Navy and information from commercial fisherman (at selected locations). These surveys were conducted January 18 through 25, 2000. The purpose of these surveys was to quantify the hard substrate, determine relief heights of the hard substrate, and determine the presence or absence of reef indicator species. The indicator species were selected in consultation with the resource and regulatory agencies to be consistent with the U.S. Navy's previous resource mapping for the project. The indicator species included surfgrass (*Phyllospadix* spp.), giant kelp (*Macrocystis pyrifera*), feather boa kelp (*Egregia menziesii*), sea palms (*Eisenia arborea*), and sea fans (*Muricea* spp.). All of these species are perennial, although feather boa kelp occur in locations

where scour and other ocean process result in high (yearly or less) morbidity. Feather boa are extremely quick to recolonize. Additionally, the occurrence of non-vegetated hard substrate or substrate vegetated only with opportunistic coralline algal turf was noted. The relative abundance of indicator species was noted as abundant, common, or sparse similar to that for the receiver site surveys.

Hard substrate on nearshore reefs in intertidal and shallow, inshore areas were assessed by walking the beach during extreme minus tides (-1.4 to -2.1 MLLW) between January 18 and 20, 2000. Next, subtidal hard substrates were mapped according to location and relief height using side-scan sonar from January 22 to 25, 2000. Following the side-scan sonar work, biologists using S.C.U.B.A. dove on the sonar-identified hard substrates and noted reef heights and presence of indicator species and/or coralline algal turf. Divers swam transects to complete map coverage between side-scan sonar and minus tide survey limits. They also swam transects to map an area off Solana Beach where kelp canopy cover had interferred with operation of the side-scan sonar. Divers deployed buoys to mark reef edges and dramatic changes in resource development (e.g., surfgrass versus non-surfgrass areas), and DGPS readings of the buoy locations were recorded. The dives were conducted from January to March 2000. Maps were prepared of the surveyed areas that included the extent of all hard substrate within the survey area, relief heights, and the recorded biological notes. The dimensions of the hard substrate areas were measured to provide acreage according to biological resource categories.

Wetlands

Ventura

No tidal wetlands occur near the Oil Piers beach placement site.

Carlsbad

Agua Hedionda Lagoon

The ocean inlet to Agua Hedionda Lagoon is located north of the proposed Carlsbad site. Aqua Hedionda has been a tidal lagoon since 1954 when San Diego Gas and Electric completed a large-scale dredging project to provide a deep water basin and cooling water for the Encina Power Plant. As a result, the lagoon exhibits a diverse community of benthic invertebrates and fish. The lagoon serves as a nursery area for marine fish and has also been proposed as critical habitat for the tidewater goby. The outer lagoon supports commercial shellfishing aquaculture, recreational boating and skiing, a marina, and a marine fish hatchery.

Two pair of jetties maintain tidal flow and power plant circulation; the northern jetties serve as an ocean inlet to the lagoon and the southern jetties serve as the warm water discharge from the power plant. The lagoon is approximately 400 acres in size and consists primarily of open water habitat. A coastal saltmarsh occurs at the eastern end of the inner lagoon and supports endangered Belding's savannah sparrow. Endangered California brown pelican feed and roost at the lagoon, and California least tern forage there as well. Cattail marsh habitat has been utilized by light-footed clapper rails for nesting. Eelgrass occurs along the shoreline throughout the lagoon. The entrance to the lagoon undergoes maintenance dredging annually or biannually and dredge materials are used to replenish beaches north, between, and south of the inlet and discharge jetties.

Regional overview (San Diego)

The project area is within the larger zoogeographic zone known as the warm temperate or Southern California Bight, whose boundaries span from Point Conception, California to Punta Eugenia, Baja California. The distributions of species within the Bight are related to the complex hydrography and geology of the region. The mainland shelf, which extends from shore to approximately -650 feet MLLW, comprises six percent of the 40,000-square mile Bight. There are no sensitive or endangered infauna species in the Bight. There are also smaller Sub-bights and the project is within the Sub-bight of Oceanside (also littoral cell).

The primary habitat of the offshore borrow sites is marine open water. Sandy substrates characterize the bottom in the vicinity of the borrow sites; however, hard substrate may support sensitive indicator species such as sea fans, feather boa kelp, and/or giant kelp. Sand and hard substrate bottoms characterize nearshore and intertidal habitats within, and adjacent to, the receiver sites. The following text provides an overview of the soft bottom and hard bottom communities which generally occur in or adjacent to proposed borrow or receiver sites. This is followed by an overview of the mammals (marine and terrestrial), and bird species which occur throughout the project area.

Soft Bottom Communities

The benthos is a general term referring to those organisms that live in (infauna), on (epibenthic), or near (demersal) the seafloor. Benthic habitats along the mainland shelf of the Bight can be divided into soft and hard bottom substrates. Each harbors a distinct and characteristic community, which varies with many environmental variables but especially water depth and substrate type. The descriptions are organized generally from the intertidal zone seaward.

Benthic Invertebrates

The soft-bottom substrates of the mainland shelf include over 5,000 species of invertebrates. Biological diversity is generally related to the complexity of habitats, water depth, sediment grain size, nutrients, contaminants, shelf width, and distance from shoreline. Benthic communities can be affected by seasonal change and episodic winter storms (waves and rain) which physically disrupt bottom communities.

Soft bottom infaunal communities have similar characteristics for a given water depth, sediment type, and wave energy. Thus, sandy infaunal communities off of Oceanside are similar to those found at similar depths and bottom type off of Imperial Beach. The infaunal zone is classified into general regions, including shallow subtidal to a depth of about -30 feet MLLW, an inner shelf zone from about -30 to -80 feet MLLW, middle shelf from about -80 to -300 feet MLLW, and outer shelf zone from about -300 to –600 feet MLLW.

Sandy beaches represent unstable habitats with seasonal cycles of sand deposition and erosion. Common invertebrates observed on San Diego County sandy beaches include beach hoppers (*Orchestodea* spp.), sand crabs (*Emerita analoga*), bean clams (e.g., *Donax gouldii*), olive snails (*Olivella biplicata*), and polychaete worms (e.g., *Euzonus* spp., *Lumbrineris* spp., *Nephtys californiensis*, *Scololepis* spp., *Scoloplos* spp.).

Bottom-dwelling species in the shallow subtidal zone are well adapted to shifting sediments and turbidity, with suspension feeders being the dominant group. Species common in sandy-bottom, nearshore areas off Oceanside include the polychaete (*Apoprionospio pygmaea*), bean clam (*Donax gouldii*), amphipod (*Mandibulophoxus uncirostratus*), and nemerteans. Similar species would be expected in nearshore sandy substrates offshore all sites.

The number of species and abundances of bottom dwelling macroinvertebrates is quite low in the inner shelf compared to the middle and outer shelf depth zones. Polychaete worms and/or small, mobile crustaceans dominate the inner to middle shelf infaunal community.

Hard Bottom Communities

Rocky habitats often are very productive ecosystems that support a variety of plants and animals. Hard bottom habitats include rocky intertidal shores and hard bottom subtidal reef. (The intertidal zone is the area between the highest high tide and the lowest low tide. Areas that are permanently inundated are defined as subtidal.) Approximately 14 percent of the coastline in San Diego County is estimated to be rocky, but the distribution of subtidal reefs is less well known than the rocky intertidal because large-scale mapping studies have not been undertaken. The proportion of hard substrate habitat at any given time relates to the amount of sand in the littoral cell and relief height. An increase in the proportion of hard bottom habitat may be occurring in conjunction with sand loss and degradation of beaches by erosion.

Several physical factors influence the types and diversity of marine life associated with rocky habitats. Important substrate qualities include relief height (low, high), texture (smooth, pitted, cracked), size, and composition (sandstone, mudstone, basalt, granite). Substrates that are of higher relief, greater texture, and size generally have the richest assemblages of marine species. Cobbles, which roll and move about within the wash zone, are dangerous to small organisms and empty of life. Rocks and reefs of low height are subjected to seasonal burial and uncovering associated with the onshore and offshore migration of sand.

Such low lying substrate tends to be devoid of organisms and is dominated by opportunistic annuals or sand tolerant species. The hardness of the substrate also is important; organisms growing on soft rock substrates (e.g., mudstones, sandstones) may be dislodged when water movement fractures or erodes the rock. In addition to relationship with substrate characteristics, marine life also differs with water level. The upper intertidal or splash zone is characterized by simple green algae (*Chaetomorpha*, *Enteromorpha*, *Ulva*), barnacles (*Cthamalus*), limpets (*Collisella*, *Lottia*), and periwinkles (*Littorina*). Coralline algae (*Corallina* spp.) is a dominant algae on low relief rocky substrate in the mid-to-low intertidal zone.

Intertidal substrates less influenced by sand burial and abrasion often support California mussel (*Mytilus californus*), gooseneck barnacle (*Pollicipes polymerus*), aggregating sea anemones (*Anthopleura elegantissima*), hermit crabs (e.g., *Pagurus*), a variety of snails (e.g., *Lithopoma*, *Kelletia*, *Tegula*), chitons (e.g., *Mopalia*), and annual species of algae.

Along the northern coast of San Diego County, the most common algae on exposed rocky substrate are coralline algal turf and seasonal species that can develop rapidly whenever a surface is free from sand, but many do not persist. Opportunistic species such as the feather boa kelp (*Egregia menziesii*), which more commonly occurs as a subtidal canopy, actively recruits to intertidal habitats on exposed rock, but rarely lives more than a year due to sand scouring, sun burn, density-dependent self-thinning, and competitive exclusion.

Persistent substrates in the low tidal zone and minus tide zone are characterized by a greater diversity of plants and animals including coralline algae, other red algae, brown algae, surfgrass (*Phyllospadix*), green sea anemones (*Anthopleura xanthogrammica*), purple sea urchins (*Strongylocentrotus purpuratus*), California sea hares (*Aplysia californica*), snails, sponges, and starfish (*Asterina miniata*, *Pisaster* spp.). Wooly sculpin (*Clinocottus analis*) is one of the more commonly encountered fish in tidepools.

Subtidal reefs in the shallow nearshore also exhibit considerable variation in resource development associated with the seasonal onshore and offshore migration of sand, and similar to intertidal reefs, substrate factors such as relief height, texture, composition, and size largely determine resource development on nearshore reefs. Higher relief reefs typically support more diverse communities that include perennial species such as sea fans (*Muricea*), sea palms (*Eisenia arborea*), sponges, nudibranchs, and sea stars, and harbor and attract a variety of fish such as garibaldi (*Hypsypops rubicunda*), blacksmith (*Chromis punctipinnis*), and black perch (*Embiotoca jacksoni*). In striking contrast, very low relief areas exhibit reduced species diversity consisting mainly of opportunistic and annual turf vegetation.

Surfgrass is a key species of an important vegetated community that ranges from intertidal to -20 feet MLLW. In southern California, surfgrass serves as a nursery for the California spiny lobster. Surfgrass, which is a long-lived perennial species, persists in rocky areas with shifting sand by having an extensive root system that binds with sand and having leaves that are tolerant of sand abrasion. However, while surfgrass may tolerate wet sand cover for many months, the duration and depth of burial that would result in morbidity has not been studied. Incremental sand burial has been reported to affect blade growth.

Surfgrass recovery rates are slow (three to five years) when recovering from removal of the root mat, but may be quicker when the rhizomes remain intact. Surveys undertaken in January and February 2000 identified and mapped approximately 42 acres of surfgrass in the intertidal from Oceanside to Torrey Pines. While the acreage in the nearshore was not surveyed by this method and is not field verified, hard substrate patterns suggest at least that same amount, and probably more, are present in the nearshore. This total surfgrass acreage off the North County San Diego shoreline is estimated at 80 to 100 acres.

As one moves further offshore to depths where seasonal sand movement is less, hard substrates do not need to have as high a relief to support perennial species. Kelp beds are an important habitat associated with offshore reefs. The kelp community, dominated by giant kelp (*Macrocystis pyrifera*), ranges from water depths of about -20 feet to -120 feet MLLW. It is a unique habitat that provides food, shelter, substrate, and nursery areas for many species of fish and invertebrates. Invertebrates found in kelp beds include lobster, sea stars, sea urchins, and mollusks. Brown, green, and red (fleshy and coralline) algae occur in kelp beds. Surfperch,

rockfish (*Sebastes* spp.), and wrasses (senorita, rock wrasse and sheephead) are usually the dominate fish type.

Kelp beds also provide a large food supply for marine birds and mammals. Cormorants are the birds most closely associated with California kelp beds; however, gulls commonly scavenge on the surface canopy, and pelicans and terns exploit schooling fish along the canopy's edge. Mammals such as sea lions, seals, and whales use kelp beds as transitory foraging areas. The giant kelp is commercially harvested for use in a variety of food products, pharmaceuticals, adhesives, paper products, paints and finishes, rubbers, and textiles.

Giant kelp is adversely affected by sedimentation and turbidity. Large amounts of shifting sediment can scour the bottom, bury small plants, and prevent settling of microscopic spores, all of which can reduce the cover in the number of adult plants. Giant kelp is one of the first species to be eliminated in physically stressed habitats (wave or sand scour). The density and abundance of kelp canopy varies by location, season, and year. Kelp beds in southern California commonly deteriorate to some degree during summer and fall when temperatures are higher and nutrient concentrations are lower. El Niño conditions, which result in higher than average temperatures and low nutrients have been linked to periodic and widespread reductions in kelp canopy. Kelp beds in northern San Diego County are in the process of recovering from the recent 1997/1998 El Niño.

Fish and Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act set forth a number of new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils,, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. The Act defines EFH as "…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal action agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to the fishery service's recommendations.

For the Pacific region, EFH has been identified for a total of 89 species covered by three fishery management plans (FMPs) under the auspices of the Pacific Fishery Management Council. As discussed below, the project area and surrounding waters provide habitat for several of these species.

Fish

Ventura

Numerous fish species, including several important game and commercial species, are found in Ventura Harbor, the Santa Clara River and lagoon, and in the nearshore ocean waters. Important fish species include the anadramous steelhead trout (Salmo gairdneri gairdneri), California grunion (Leuresthes tenuis), bass (Paralabrax sp.), California halibut (Paralichthys californicus), and several species of rockfish (Sebastes sp.).

Love et al., (1986) conducted a trawling program at several shallow water soft bottom stations within the Southern California Bight. This program included a station off Ormond Beach, near Ventura Harbor. Queenfish (Seriphus politus) and white croakers (Genyonemus lineatus) were the dominant species at all depths sampled. Anchovy (Engraulis mordax), halibut, and speckled sanddabs (Citharichthys stigmaeus) were important species at all depths. Steelhead trout (Salmo gairdneri) occasionally occur in the area, and spawn in the Santa Clara River (McEwan and Jackson 1996). Their young often stay in estuaries for a time to feed and adjust to saltwater before migrating to the sea.

The California grunion (Leuresthes tenuis), a small fish in the silversides family (Antherinidae), is extremely unusual among fish in its spawning behavior. The grunion spawns on some southern California beaches, including McGrath State Beach, immediately following high tides from Mid-March through August. The eggs are incubated in the sand until the following series of high tide conditions, when the eggs hatch and are washed into the sea. California grunion is a species of concern due to its unique spawning behavior, and is carefully managed as a game species by the California Department of Fish and Game.

San Diego

Speckled sanddabs (*Citharichthys stigmaeus*) are the most abundant fish species of the inner shelf with only a few individuals found in the middle shelf zone. Fish commonly found on the bottom in sandy subtidal habitat (less than 30 feet) off San Diego County beaches include: halibut (*Paralichthys californicus*), speckled sanddab, bat ray (*Myliobatus californica*), and shovelnose guitarfish (*Rhinobatos productus*). Northern anchovy *(Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), and Pacific bonito (*Sarda chiliensis*) are commonly encountered in the water column just beyond the surfzone.

The California grunion (*Leuresthes tenuis*) is common south of Point Conception, California, to Magdalena Bay, Baja California, in nearshore waters from the surf to a depth of 60 feet. Grunion travel from their habitat in nearshore waters to specific sandy beaches just after certain full and new moons in conjunction with their spawning. Grunion on San Diego beaches are typically found on the long, gently sloping beaches with moderately fine grain size. Grunion are managed as a game species by the California Department of Fish and Game. Their spawning season occurs from March to August.

Mammals

Several terrestrial and marine mammal species occur in the project area. The California sea lion (Zalophus californianus) and harbor seal (Phoca vitulina) are found feeding and resting in nearshore waters and occasionally resting on the beach; however, these species do not breed at this site.

Several species of mammals occur in nearshore waters adjacent to the receiver sites and in offshore waters near the borrow sites. California sea lions (*Zalophus californicanus*) and harbor seals (*Phoca vitulina*) are found in these waters and may, occasionally, use the beach (Department of the Navy 1997a, 1997b).

Common dolphins (*Delphinus delphis*) and bottlenose dolphins (*Tursiops truncatus*) occur in the surfzone and in offshore waters. Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) and Risso's dolphins (*Grampus griseus*) also are known to occur seasonally in southern waters of the Bight. California gray whales (*Eschrichtius robustus*) migrate through the study area. The southbound migration through the Bight begins in December and lasts through February; the northbound migration is February through May. Gray whales migrate up to 125 miles offshore along three pathways through the Bight. The project area lies within the nearshore migration path, which extends from the shoreline to approximately 12 miles offshore.

Birds

Numerous bird species are found in the harbor area, at South Beach, and at McGrath State Beach. The State Park Service provided a checklist of nearly 70 bird species known from McGrath State Beach. Some of the more common species expected in the Harbor and near-shore areas include western grebe (Aechmorphus occidentalis), great blue heron (Ardea herodias), western sandpiper (Tryngites subruficollis), willet (Catoptrophorus semipalmatus), American avocet (Recurvirostra americana), marbled godwit (Limosa fedoa), and western gull (Larus occidentalis). Birds typical of the marsh and riparian areas include northern harrier (Circus cyaneus), cinnamon teal (Anas cyanoptera), mallard (A. platyrhinchos), loggerhead shrike (Lanius ludovicianus), long-billed marsh wren (Telmatodytes palustris), Virginia rail (Rallus limicola) and yellow-breasted chat (Icteria virens).

The southern California coastline is a diverse habitat for migrant and resident birds. The proposed beach sites and nearshore waters provide a variety of areas for seabirds to roost and forage. Sandy/cobblestone upper tidal beaches are utilized by gulls and shorebirds as roosts (resting-places). However, cobblestone areas in the intertidal are not typical feeding areas for shorebirds. Probing shorebirds will forage upon invertebrates in the damp, sandy middle and lower tidal zones. Kelp and surfgrass that have washed ashore are good foraging areas for gulls, shorebirds, and even some passerines, as they harbor and are fed upon by invertebrates. Other areas of rocky/reef substrates provide tide pools filled with marine animals for foraging gulls and shorebirds. The nearshore ocean accommodates birds such as gulls, pelicans, terns, and cormorants, which prey upon the schooling fish and other marine organisms below.

Also within the project area are inlets for several lagoons, estuaries, and bays. These coastal ecosystems are havens for a huge diversity of birds due to their varied habitat. The shallow water and shoreline provide roosting, foraging, and nesting areas for such birds as ducks, terns, shorebirds, pelicans, cormorants, gulls, herons, raptors (such as ospreys and northern harriers), and various passerines in the surrounding vegetation. Some of these wetlands also provide rest stops for migrating birds along the Pacific Flyway.

Carlsbad

Sand is the predominant habitat at this proposed site. Sand depths averaged three inches in the upper, 10 inches in the mid, and 15 inches in the lower intertidal. The site was revisited in July and sand depths had increased four to ten-fold at specific locations and averaged 31 inches overall. Sand crabs, polychaete worms, and bean clams were noted in the sand habitat. Only a

few gulls were observed foraging and resting at the site during the May 1999 survey. During the May 1999 survey, 30 to 100 percent cobble bands occurred along the back beach in the upper intertidal and less dense cobble cover extended up to 105 feet seaward in localized areas. During the July 1999 survey, dense cobble bands were pushed higher up the beach and did not extend more than about 40 feet from the bluff. Mid and low intertidal areas had less than cobble cover. No marine life was observed on the cobble.

A hard substrate area (approximately 183 feet long) occurred in the lower intertidal between 1,251 and 1,434 feet south of the site's northern boundary and 230 feet seaward of the back beach. The area consisted of scattered low relief rocks and bench. The low relief rocks supported few marine resources. Filamentous red algae was common and coralline algae and hermit crabs were sparse in occurrence.

California grunion eggs were not observed in shovel samples collected during the May or July 1999 surveys. Cobble cover and inadequate sand depths may have limited the ability of this site to support grunion egg laying during the May survey. While sand depths were sufficient in the lower part of the upper and mid intertidal zones, cobble cover was still dense in part of the upper intertidal during the July survey.

Nearby Sensitive Resources
The closest California least tern and western snowy plover nesting sites are at Batiquitos Lagoon, which is about 1.8 miles south of the site. A small inshore surfgrass patch occurs over one mile south of the receiver site.

A localized low relief hard substrate area was observed over 250 feet south of the site's southern boundary. No sensitive resources were found. Filamentous red, coralline, and crustose red algae were the only marine life observed on the rocks.
Nearshore waters are characterized by mostly sandy bottom with low-relief, scattered reef offshore most of the site. This low-relief reef area begins 600 feet offshore in -5 to -10 feet MLLW, which is about 350 feet from the seaward boundary of the site. Patchy surfgrass and feather boa kelp were observed on the reef in 1997. Patches of high-relief reef occur south of the site, beginning 775 feet offshore in -7 to -15 feet MLLW. Surfgrass and feather boa kelp were on those reef areas in 1997. No kelp canopy was present in the vicinity of the site in 1999. The closest kelp bed in 1997 was about one mile south. Historically, kelp has occurred offshore the site at depths greater than 20 feet above MLLW.

Moonlight Beach
While some of the site is sand habitat, during the May 1999 survey, 30 to 100 percent cobble bands extended 30 to 80 feet seaward of the back beach. No marine life occurred on the cobble. Sand depths averaged 3 inches in upper, 11 inches in the mid, and 21 inches in the lower intertidal zones. The mid and lower intertidal sand habitat was occupied by sand crabs and polychaete worms. California grunion eggs were not observed in shovel samples collected during the May 1999 survey. Shallow sand depths and some cobble cover in the upper intertidal may have been limiting to grunion egg laying during the survey period.

Nearby Sensitive Resources
The closest California least tern and western snowy plover nesting sites are at Batiquitos Lagoon, which is about 2.5 miles from the receiver site. The nearshore waters off Moonlight Beach are characterized by mostly sandy bottom, with a low-relief reef starting 500 feet offshore in -6 feet MLLW, just north of the site at a distance of about 400 feet from the seaward boundary of the site. Scattered giant kelp, surfgrass, and feather boa kelp were found on the low-relief reef in 1997. The Encinitas City Marine Life Refuge lies immediately south of the site. Refer to Section 3.6. The nearshore area offshore the receiver site and extending further south nearly to I Street was surveyed in January 2000 by side-scan sonar and by divers. One small reef (0.04 acre) had very sparse occurrence of surfgrass (1 turion per 10 ft^2 (4 m^2)). Feather boa kelp was fairly ubiquitous but ranged from sparse to common abundance on several reefs. Several reefs and scattered rock areas were only vegetated with opportunistic coralline algal turf. They mainly occurred in water depths ranging between -10 and-20 feet MLLW. Giant kelp, sea fans, and/or sea palms occurred on reefs at depths ranging from -20 to -35 feet MLLW. Sea fans were on relative higher relief substrate (greater than two feet). Giant kelp occurrence was sparse, but localized areas with juvenile plants indicate some recovery from the 1997 El Niño event.

No kelp canopy was mapped in the vicinity of the site in 1999. In 1997, giant kelp beds were found offshore of the north end and to the south, off Santa Fe Drive. These beds were approximately 1,200 feet offshore at depths greater than -20 feet MLLW. A small patch occurred approximately 1,200 feet directly offshore at depths of -20 to -25 feet MLLW, and was about 850 feet seaward of the site boundary. Historically, there has been a relatively high persistence of kelp in the vicinity of the site.

Solana Beach
The beach habitat is predominantly sand with some cobble. Sand depths ranged between two and 40 inches with an overall average of 14 in during the May 1999 survey. Depths measured at several of the same locations in July 1999 indicated a build up of the beach over the two months following the survey. The average sand depth in July 1999 was 21 inches in the upper, 25 inches in the mid, and 37 inches in the low intertidal zones. Sand crabs, polychaete worms, and amphipod crustaceans occupied the sand habitat.

Cobble varied from being more dense in the northern half of the site to fairly sparse in the southern half. Cobble cover exceeded 60 percent at Fletcher Cover during the May and July 1999 surveys and occurred in dense bands along the cliff and extending out to 40 feet seaward further north. No marine life was associated with the cobble.

Two reef areas were observed south of Fletcher Cove within the site boundaries during the minus tide surveys and one was observed just south of the boundary. The beach site was surveyed in May and July and a brief visit was made in June 1999. The amount of the exposed reef habitats differed between surveys. The few marine resources observed on all three reefs indicated that the sites experience frequent sand disturbance.

A 350-foot long area with patchy, low relief reef occurred in May 1999 between Fletcher Cove and South Helix Street. The reef started 200 feet seaward of the cliff and extended offshore through the site's offshore boundary. Filamentous red algae was common on the rock and juvenile feather boa kelp was sparse in occurrence. In July, sand had covered 200 feet of the reef and filamentous red algae was the only resource observed on the 150-foot long patchy reef area. A 250-foot long by 185-foot wide patchy, low relief reef area was observed between offshore South Helix Street starting 60 feet seaward of the back beach both in May and July. With the exception of filamentous and coralline red algae, which were common in occurrence, there were few biological resources. Very sparse in occurrence were juvenile feather boa kelp (average size 22 inches), *Ulva* green algae, small leafy brown and red algae, aggregated sea anemones (average size 21 inches), and chitons.

Just south of the southern end of the site, a small (80-foot long) patchy low relief area began about 200 feet seaward of the back beach and extended offshore. Feather boa kelp (juvenile to adult size; average size 88 inches) was common in occurrence as was filamentous red algae. Other algae such as coralline and small leafy red algae were sparsely distributed. The only invertebrates were hermit crabs, which were sparse in occurrence.

California grunion eggs were not observed in shovel samples collected during the May and July 1999 surveys. Sand depths generally were insufficient in the upper intertidal during the May survey, but there was sufficient sand in July. The narrow beach width probably would have been limiting to grunion laying because waves were breaking at the base of the cliff on the incoming portion of the tide during both surveys.

Nearby Sensitive Resources
The closest California least tern and western snowy plover nesting sites are located at San Elijo Lagoon, which is located within one mile from the receiver site. Inshore intertidal surfgrass occurs at three sites north of the receiver site; one at the surf spot known as Pill Box, another north of Tide Park, and a third further north at Table Tops reef.

Several intertidal reef areas outside the site boundaries were noted both north and south of the site. The closest reef area to the north is a surfing location known as Pill Box. This consisted of a 145-foot long, high relief reef area (starting 152 feet seaward of the cliff) and a low relief reef that extended further north (from approximately 400 to 1,000 feet north of the northern site boundary) in May 1999. In July 1999, sand build up had reduced the above ground height of most of that reef to 27 to 29 inches except at a distance of approximately 270 feet seaward of the cliff. At that location, the reef height ranged up to 38 inches. Resources on the high relief area were similar between the May and July surveys and included juvenile feather boa kelp (average size 24 inches), *Ulva* green algae, small leafy brown and red algae, and sea anemones (average size 29 inches). A 145-foot by 8-foot area of surfgrass occurred on the high relief reef just seaward (268 feet from the cliff) of the site's offshore boundary.

The low relief area supported filamentous and coralline red algae, *Ulva* green algae, small leafy brown algae (e.g., *Colpomenia*, *Dictyota*/*Pachydictyon* sp.) feather boa kelp, and hermit crabs, which were sparse to common in abundance. In July, a portion of the area was covered with sand, and in other areas the low relief rock and reef ranged in height from zero (i.e., flush with

sand) to eight inches. Filamentous red algae, small leafy brown algae, and hermit crabs were common in abundance, and feather boa kelp was very sparse in occurrence on the reef in July.

North of that location were two small patch reefs with little resource development in May 1999 that were completely covered with sand in July 1999. Offshore Tide Park, more reef area was exposed in May than in June and July. During the May 1999 survey, surfgrass, feather boa kelp, a variety of algae, several types of snails (*Lithopoma undosa*, *Kelletia kelletia*, *Ocenebra* sp., *Tegula* sp.), sea hares, aggregated sea anemones, and hermit crabs were observed. During a visit in June 1999 and the July 1999 survey, most of the reef area was covered with sand. Surfgrass with patchy, feather boa kelp was lying on the sand surface, algae (except filamentous red) was sparse in occurrence on any of the exposed rock, and hermit crabs were the only visible invertebrates.

During the June 1999 site visit, it was noted that extensive mounds of turf algae and kelp were on the beach at Tide Park. A City Parks Department bulldozer was clearing the beach of the accumulated material by pushing it into the surfzone. During the July 1999 survey, this material was observed washed up on the beach at the northern end of Tide Park and extended along the beach further north. It is suspected that sand and/or cobble scour associated with the sand build-up had stripped the reef area of the algae.

Even further north is the extensively developed reef known as Table Tops. That reef had extensive development of biological resources including a variety of algae and invertebrates, and substantial surfgrass beds. Juvenile to adult sized California mussels, relatively large sea anemones, large colonies of sand castle worm (*Phragmatopoma californica*), and a diverse range of resources at the site indicate that this is a persistent reef area. Substantial sand build up also occurred at this site between June and July 1999 and included partial burial of some surfgrass. Navy monitoring at this site records about three feet of sand build up between the spring and fall of 1999. This location is one of the sites currently being monitored by the Navy as part of the permit conditions associated with the previous Homeporting project. Monitoring will continue here until 2001.

The closest reef to the south was located approximately 600 feet south of the southern site boundary. It consisted of a 459-foot-long area with patchy reef. With the exception of four rocks (each about 6 feet wide) that were 27 inches in height, exposed sandstone benches were either flush with the sand or only a few inches in height. Common in occurrence were feather boa kelp (average size 71 inches), a variety of turf algae, aggregated sea anemones, and hermit crabs. Although this site was only visited in July 1999, the occurrence of feather boa kelp on the surface of the sand in several places indicates that sand build up had also occurred at this site since May 1999.

The next closest reef area to the south was located over 1,600 feet south of the southern site boundary. Both low and high relief benches and rocks were present in the upper intertidal through minus tide zones. Feather boa kelp (juvenile to adult sizes, average size 28 inches), a variety of red turf algae, *Ulva* green algae, small leafy brown algae, sea anemones, California mussel, *Acanthina* snails, limpets, hermit crabs, and striped shore crabs were present. There was fairly high public use of the rocky intertidal area during the July 1999 survey.

A side-scan sonar survey was conducted offshore between Tide Park and Pill Box reef in January 2000, however, surface kelp canopy interfered with acquisition of side-scan sonar maps for part of the site. Storm conditions with large swell and surf have limited dives at this site later in January and February 2000. The side-scan sonar maps indicate predominantly low relief reef, although high relief associated with the Pill Box reef to the south and high relief to the north was mapped within the extent of survey boundary. Limited diver surveys have verified some reef heights under the kelp canopy, and assessed resources on some reefs mapped outside the kelp canopy. In some locations, the kelp that was present in January 2000 had been eliminated by storms in February 2000.

No kelp canopy was mapped within one mile of the site in 1999. In 1997, kelp beds were mapped offshore the site. The shallowest portions of these large beds were in -15 to -30 feet MLLW, about 1,075 to 2,000 feet offshore (Table 3.4-2). The large bed in the northern portion of the site was approximately 0.2 square mile, and the large bed in the southern portion was 0.1 square mile in size. Historically, there has been a relatively high persistence of kelp in the vicinity of the site.

2.3 Threatened, Endangered, and Other Special Status Species

Federally Listed Species

Ventura

Five animal species listed as Endangered by the USFWS pursuant to the Endangered Species Act of 1973, as amended, are known to occur in the Ventura Harbor vicinity. Salt marsh bird's beak (*Cordylanthus maritimus maritimus*), a listed plant species, may have been extirpated from the salt marsh behind McGrath State Beach. Marine mammals are also potential, but unlikely, visitors to the area.

Over 70 species of birds are known or expected to occur in the project area. Because of the proximity of some receiver sites to coastal inlets, species associated with wetlands have the potential for occurrence at some beach receiver sites. Threatened and endangered bird species with known or expected occurrence in the project area include California brown pelican, California least tern, western snowy plover, and American peregrine falcon (described below).

California Brown Pelican

The California brown pelican is a year-round resident of the southern California coastline. It is most abundant on the mainland coast from August to November. Breeding occurs on several California islands from June to October. The brown pelican feeds primarily on surface-feeding fish in the nearshore waters. The species is often very tolerant of human activity near its daytime roosts, and utilizes various shoreline structures such as piers, breakwaters, groins and buoys for daytime roosting.

The brown pelican is relatively common in the nearshore waters of the project area, particularly when schools of suitable fish prey are present. It usually forages in waters greater than one mile from the coast, but may also be found roosting on the existing tanker ship buoys,

breakwater, and rock groins in the nearshore waters of the project area. The brown pelican is also fairly common at the mouth of the Santa Clara River. Activities of the brown pelican in these waters are restricted to feeding, overflying, or temporary resting.

The California brown pelican is a protected species in California and is listed as endangered by both the federal and state government. They are found in the open ocean and other coastal salt waters along the southern California coast throughout the year. This species is tolerant of human activity near its daytime roosts and readily utilizes various man-made structures (e.g., piers, breakwaters, buoys) as roosting sites. Known breeding locations include offshore islands such as Anacapa and Santa Barbara Islands in southern California and islands off the coast of northwestern Baja California, Mexico.

California Least Tern

An established California least tern nesting site is located on the north side of the mouth of the Santa Clara River, between the disposal sites at South Beach and McGrath State Beach. The designated nesting site is fenced to protect the nesting terns from predators and human intrusion, but some least terns nest outside the fenced area. The least tern is a migratory bird that breeds and nests along the coast of southern California. At the Santa Clara River mouth site, breeding begins in middle to late April and continues through August. Breeding habitat consists of unvegetated, open, sandy areas, usually protected from predators and humans by measures instituted by the California Department of Fish and Game. The least tern feeds primarily on surface fishes, such as topsmelt and anchovies, in nearshore waters and estuaries near the breeding colonies.

The California least tern (*Sterna antillarum browni*) has been listed as endangered federally and by the state since 1972. This small tern nests in colonies along the southern California coast on sandy beaches with sparse vegetation. It forages in shallow ocean water, generally less than 60 feet deep and within one mile of shore, and in wetlands nearby these nesting habitats. Wetland destruction and human developments along the coastline have impacted least tern's nesting habitats, as well as their foraging resources.

The San Diego nesting sites are located as far north as Marine Corps Base (MCB) Camp Pendleton and extend southward to the United States/Mexico border. Nest locations are on the beaches of MCB Camp Pendleton near the Santa Margarita River mouth, around Mission Bay, and the greatest number of sites are found around San Diego Bay. Other nests were found in Batiquitos and San Elijo Lagoons. The least tern nesting season is April 1 to September 15. Least tern's usually feed in waters within a two-mile radius of their nesting site, but observations suggest the tern's opportunistic foraging can take it as far as five miles away.

Western Snowy Plover

The western snowy plover is listed as Threatened by the USFWS (58 FR 12864, March 5, 1993). Nest sites typically occur in flat, open areas with sandy or saline substrates. Vegetation and driftwood are usually sparse or absent. Nest site selection and pair bond formation occur from early to mid-March, and eggs of the first clutch are usually laid by early April. Snowy plovers forage on invertebrates in the wet sand and amongst surf-cast kelp within the intertidal zone; in

dry, sandy areas above the high tide; on salt pans; and along the edges of salt marshes and salt ponds.

Studies in California, Oregon, and Washington indicate that the coastal breeding population has declined significantly in recent years (Page and Stenzel 1981; Wilson 1984). Fewer than 1500 birds, and 28 nesting sites, remain in the three states. The subspecies of plover has disappeared as a breeding bird from most of California beaches south of Los Angeles, and development has eliminated the plover as a breeding species from many other coastal areas, as well. Dune stabilization by introduced beach grass has also modified much formerly open coastal sand flat habitat. Evidence exists that human activity (i.e. recreation, beach cleaning), is responsible for some of the coastal decline, as well as predation by pet dogs, crows, foxes, skunks, and other animals.

Three snowy plover nests were identified near or within the least tern nesting area during bird surveys in the summer of 1993. The USFWS has proposed the lower 2 miles of the Santa Clara River, the river mouth, and the beach south to the Channel Islands Harbor as critical habitat for the snowy plover (60 FR 11805, March 2, 1995).

The western snowy plover (*Charadrius alexandrinus nivosus*) was listed as threatened in 1997. Their decline is a result of loss of nesting habitat due to coastal development and recreational activities. Along the southern California coast, snowy plovers nest on bay fill and beaches around bays and lagoons, spits and alkali flats at river mouths, and on salt evaporators. Plovers typically forage in areas with little or no human activity and avoid areas of high human use. They prefer to forage on sandy beaches with kelp washed ashore. The San Diego region supports 26 percent of the estimated breeding pairs on the California coast.

A cluster of nest sites are located around the mouth of the Santa Margarita River on MCB Camp Pendleton and around the San Diego Bay. The other nests are spread out in between those two sites on Carlsbad State Beach/Agua Hedionda Lagoon; around Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos Lagoons; and along Mission Beach and Bay. Snowy plovers forage close to their nests probing in the sand for invertebrates or running along the sand snatching up insects in the air. The nesting season extends from March 1 to September 15.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) was listed by the federal and state governments as an endangered species in 1970. On August 25, 1999, the USFWS removed the American peregrine falcon from the Endangered Species List, although it currently remains on the state endangered species list. Current nesting locations include the San Diego metropolitan area and Point Loma. Preferring to hunt along larger waterways and coastal areas, particularly where large numbers of shorebirds and waterfowl congregate, peregrine falcons likely utilize the project area on an occasional basis.

Tidewater Goby. A brackish water fish species, the tidewater goby (Eucyclogobius newberryi) is a Federally-listed Endangered species. Adapted to both fresh and saltwater, this species was once found in the brackish water portions of streams from Humboldt County to San

Diego County. This species has been recorded in both the Ventura and the Santa Clara rivers. Draining lagoons and channelizing streams and lagoons, as well as destruction of wetland habitat, have been the major cause of population losses of this species. Significant amounts of disposal within the Santa Clara River could also impact the tidewater goby.

Steelhead Trout. Steelhead trout (Salmo gairdneri), listed by the NMFS as an endangered species (50 CFR Parts 222 and 227, August 18, 1997), occasionally occur in the area, and spawn in the Santa Clara River (McEwan and Jackson, 1996). Their young often stay in estuaries for a time to feed and adjust to saltwater before migrating to the sea. Steelhead trout have well developed homing abilities and often spawn in the same stream in which they were reared as juveniles. Upstream migration usually takes place between January and March. Young steelhead emerge from gravelly spawning areas between March and May and live in freshwater for one to four years before downstream migration to the ocean from February to May (USFWS Planning Aid Report, March 1997; Entrix, 1994).

III. Cultural Resources

Regulatory Setting

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on cultural resources eligible for the National Register of Historic Places. To be eligible for inclusion in the National Register properties ordinarily must be at least 50 years old (unless they are exceptionally significant), and must be important in American history, architecture, archaeology, engineering, or culture, at the national, state, or local level. They also must possess integrity of location, design, setting materials, workmanship, feeling, an association, and meet at least one of the four following criteria: (a) associated with events that have made a significant contribution to the broad patterns of our history, (b) associated with the lives of persons significant in our past, (c) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or possess high artistic values, or that represent a significant distinguishable entity whose components my lack individual distinction, and (d) have yielded, or may be likely to yield, information important in prehistory or history (National Register of Historic Places, 36 CFR part 60.4).

The types of cultural resources within the project area that may be eligible for the National Register include archaeological resources dating from the aboriginal and historical eras of occupation; historic buildings, structures, and landscapes; and traditional cultural places. These cultural resources are defined as historic properties in the language of the NHPA. Thus, historic properties may be districts, sites, buildings, structures, or objects. Cultural resources are located and identified by first conducting a records and literature search of the project area; then, performing an archaeological survey of the area of potential effects (APE).

Regulations for Protections of Historic Properties (36 CFR part 800) define a process for federal agencies to follow in order to ensure that National Register-eligible properties are duly considered as federal undertakings are planned, approved, and implemented. The Process involves consultation with State Historic Preservation Officers (SHPOs), the federal Advisory

Council on Historic Preservation (ACHP), as warranted and other interested parties, including Native American Tribes. The steps in this Section 106 process include the following: (1) defining, in consultation with the SHPO, the area of potential effect, designing appropriate procedures to inventory and evaluate resources, and identifying appropriate consulting and interested parties, (2) inventorying and evaluating the National Register eligibility of cultural resources that may be affected by the proposed undertaking (as explained above), (3) assessing the potential effect of the undertaking on National Register-eligible properties, (4) if appropriate, consulting with the SHPO, ACHP, and other interested parties to determine ways to avoid or reduce the impacts of the proposed undertaking on National Register-eligible properties, and (5) if necessary, proceeding with the undertaking under the terms of a Programmatic Agreement or Memorandum of Agreement.

Cultural Setting (Ventura)

The prehistoric Chumash population inhabited southern California from San Luis Obispo to Malibu Canyon on the coast and inland as far as the western edge of the San Joaquin valley. In addition, they occupied the four northern Channel Islands—San Miguel, Santa Rosa, Santa Cruz, and Anacapa. Classified under the Hokan family, six different Chumash language have been recorded—Ventureño, Barbareño, Ynezeño, Purisimeño, Obispeño, and the Island language. Most of our information from the prehistoric Chumash comes from the diaries of Spanish explorers, missionaries, and soldiers. For this reason, Chumash languages have been named in accordance with the name of the mission the various groups belonged to—San Buenaventura, Santa Barbara, Santa Ynez, La Purísima Concepción, and no mission was established on the islands. In combination with Spanish records and archaeological evidence, researchers have been able to interpret Chumash culture prior to European contact.

The temperate climate and exceptionally rich marine environment provided a relatively comfortable life for the Chumash population. Being a maritime people, they skillfully exploited the readily available marine resources. They fed on fish, mollusks, crustaceans, and marine gastropods. In addition, they made fishhooks, bowls, pries, shell beads, and other utilitarian items out of sea shells. They used asphaltum, which was collected on the beach, to waterproof their *tomols* and basket-weaved water bottles. The Chumash *tomol*, plank canoe, made it possible for them to fish in the ocean and trade with groups living on the Channel Islands. Kroeber describes the Chumash as mariners who took to their boats not only as necessary, but daily as long as the weather permitted (1925:558).

The Chumash were the first tribe in California to experience European contact with the arrival of Cabrillo in 1542. Socially organized as a chiefdom, the Chumash were a peaceful people without neighboring enemies; although, internal conflict did exist. They built large partitioned huts that housed up to fifty individuals. They slept on beds, buried their dead, and used shell bead money. The early Spanish explorers considered them superior to other California tribes because of their technological and economic advances. The Spanish did not provide much information about Chumash spirituality. The Chumash were missionized for 62 years from 1772 to 1834. After secularization, the tribes did not receive the lands they had been promised. Much of the land was given away to influential Mexicans. Some of the Chumash were hired to work on the ranchos, but they were treated badly and paid poorly. With the advent of the Gold

Rush in California, the Indian situation was made worse. At this time, alcoholism and gambling made their social situation even worse and most Indians were openly ridiculed. Kroeber in 1925 writes, "To-day there remain scarcely a dozen old men and women who still speak the language of their grandfathers, although the number of individuals admitting pure or partial Chumash is somewhat greater" (551).

Cultural Setting (Carlsbad, Encinitas, Solana Beach)

Heading south along the California coastline to San Diego from Los Angeles, one bypasses the territories of the Native American populations presently referred to as the Gabrielino, the Juaneño, the Luiseño, and the Diegueño (or Ipai). One is in Gabrielino territory until arriving at Aliso Creek; then, it is Juaneño territory until midpoint San Onofre and Las Pulgas. From this point, Luiseño territory extends down to Agua Hedionda Creek; then, Diegueño territory extending past the Mexican border into Baja California. These indigenous groups, like most of the California tribes, have been named based on the mission located within their territories—Mission San Gabriel, Mission San Juan Capistrano, Mission San Luis Rey de Francia, and Mission San Diego, respectively. The Carlsbad, Encinitas, and Solana Beach coastlines, for the most part, lie within Luiseño boundaries.

Luiseño territory inhabited a wide range of ecological zones from the coast inland, which included: ocean, sandy beaches, shallow inlets, marshes, coastal chaparral, lush interior grassy valleys, extensive oak groves, up to the pines and cedars on the top of Mount Palomar (Bean and Shipek 1978). This environment was rich in, both variety and quantity of, natural resources. They lived in sedentary and autonomous village groups, each with specific hunting, collecting, and fishing areas (Bean and Shipek 1978). The concept of private property was very important to the Luiseño and they considered trespassing a major cause for war (Bean and Shipek 1978). Because of the variety of ecological zones within their territory, subsistence ranged from deer, rabbits, squirrels, ducks, and trout to sea mammals, fish, crustaceans, and mollusks (especially abalone)—including the all important acorns (Bean and Shipek 1978).

In 1798, Mission San Luis Rey de Francia was the eighteenth mission founded and it was named after Saint Louis IX, king of France in the 1200s. With secularization in 1834, "the breakup of the mission and its property resulted in the freeing of the Indians from what had often been, at best, involuntary servitude (Moratto et al). At this time, some of the Indians worked on the newly formed Mexican ranchos while others rebelled against them and raided their property. From 1841-1851 hostilities escalated to almost open warfare conditions. United States troops entered the San Luis Rey Valley in the first year of the Mexican-American War (1846-1848). And in 1850, California was admitted to the Union. In 1978 Bean and Shipek wrote, "While the Luiseño language is spoken by only a few elderly people, there is a revival of interest among the young and language classes have been organized."

Records and Literature Search and Field Survey

The southern California coast is rich with cultural resources, thus, it is expected that this project will have an impact on historical properties. As soon as an alternative is selected, a records and literature search along with a field survey will be conducted of the area of potential

effects (APE). The records and literature search will be conducted at the South Central Coastal Information Center at California State University, Fullerton. This facility is part of the California Historical Resources Information System (CHRIS), which is a statewide system for managing information on prehistoric and historical resources identified in California. It is authorized and directed by the state Office of Historic Preservation (OHP) with twelve regional information centers.

The information available at these centers consists of hardcopy of both current and historic records and maps. The main body of the information is individual site record forms, and copies of archaeological and historical survey reports, along with copies of historic maps. Using this information, one can determine the location and description of known historic and prehistoric resources. It is also possible to determine if a field survey has been conducted on a particular piece of property. Based on an analysis of this information, it is possible to make an evaluation of the potential for there being resources in areas that have not yet been surveyed. In addition, this information is useful in planning the field survey. If the project extends offshore, remote sensing surveys will be used to locate underwater sites. If it is concluded that this project will have an adverse effect on a Register-eligible site, avoidance measures and/or mitigation measures will be implemented in compliance with Section 106 of the National Historic Preservation Act (NHPA).

IV. Aesthetics

Carlsbad

This site is visible from South Carlsbad State Beach Campground. Portions of the northern site are visible from the parking areas north of the campground and Carlsbad Boulevard. The southern site is obscured from drivers by the intervening campground. This receiver site is characterized by a sand and cobble beach abutted by steep bluff slopes. The only development along this stretch of beach is the State Beach Campground located on the bluff approximately 65 feet above the site. Several stairways run from the campground down onto the beach. The pipeline to serve these two sites would be extended from borrow site SO-7 which is offshore from Batiquitos Lagoon to the south. It would come ashore north of the lagoon and traverse State Beach recreation area to the receiver sites. The general goal is to place the pipeline at the base of the bluffs to reduce exposure to wave action. In this area the bluff slopes vary from non-existent at the lagoon mouth and 60 to 80 feet at the campground. There are no residents adjacent to the pipeline route.

Encinitas

This receiver site has bluffs on either end, and Moonlight State Beach park at the terminus of B Street. Views of the site would be available from residents and park users. The site contains a wider sand area at the park because in this location the bluffs trend easterly and open up to allow Cottonwood Creek to drain into the ocean. There is a narrow sand shelf from the cliffs to a cobble slope, then sand sloping to the water. Rip-rap has been placed at the base of the bluffs to protect structures. At high tide the water comes to the base of the bluffs and the beach is not visible. The delivery pipeline would be located at the base of the bluffs between the Leucadia receiver site and this site. The character of the area traversed by the pipeline would be much the same as described under Leucadia.

Solana Beach

This receiver site sits below steep cliffs and is visible from the stairs at Solana Vista Drive, Fletcher Cove, and some residences along the bluff. It currently consists of little or no existing beach area. Views of the beach along this stretch are dependent upon the tides. At high tide the beach is not visible along the majority of the receiver site as waves crash directly against the cliffs. The only exception is the small sandy beach at Fletcher Cove which sits above the high tide mark and is located just north of the receiver site. At low tide a low profile sand and cobble beach is visible below the cliffs.

Ventura

The aesthetic character of Ventura Harbor, South Beach, and McGrath Beach State Park and immediate vicinity is basically comprised of public and commercial water-oriented recreational facilities. The scenic and visual resources of the project area are dominated by the harbor, marina, beach, and open-water vistas.

V. Land Use

Coastal Plans and Policies

Under the federal Coastal Zone Management Act of 1972 (16 C.F.R. § 1451 (1997)), long range planning and management of California's coastal zone was conferred to the state with implementation of the California Coastal Act in 1977. The California Coastal Act (Cal. Code Regs. Title 14 § 30000) created the CCC who assist local governments in implementing local coastal planning and regulatory powers. Under that Act, local governments are encouraged to adopt LCPs. The LCP consist of a Land Use Plan (LUP) with goals and regulatory policies as well as a set of Implementing Ordinances. Of the seven local jurisdictions for this project, six have approved LCPs acceptable to the CCC (Solana Beach is currently drafting its LCP).

Several sections of the California Coastal Act focus on shoreline construction, specifically Sections 30235, 30233, and 30706. All of these sections contain an element pertaining to the protection of existing structures and the protection of public beaches in danger of erosion. Under these sections, construction will be allowed through revetments, breakwaters, groins, or other means that alters natural shoreline processes; dredging of open coastal waters, lakes, wetlands, and other areas will be permitted only where less feasible environmentally damaging alternatives are not available. In particular, in Section 30233, dredging and spoils disposal, planned to avoid significant disruption to marine and wildlife habitats and water circulation, is allowed for restoration purposes. Section 30233 states further that dredge spoils suitable for beach replenishment should be transported to appropriate beaches or into suitable longshore current systems. The Coastal Act also requires that new construction (Section 30253[2]) shall not require the construction of protective devices for erosion control.

California State Lands Commission

The California State Lands Commission (CSLC) has exclusive jurisdiction over all of California's tide and submerged lands and the beds of naturally navigable rivers and lakes, which lands are sovereign lands, and swamp and overflow lands and State School Lands (proprietary lands). Authority of the CSLC originates and is exercised from the state's position as a landowner. The CSLC has statutory authority (Division 6 of the California Resources Code) to approve appropriate uses of state lands under its jurisdiction and is the administrator of the Public Trust Doctrine over sovereign lands. The Public Trust is a sovereign public property right held by the State or its delegated trustee for the benefit of the people. This right limits the uses of these lands to waterborne commerce, navigation, fisheries, open space, recreation, or other recognized Public Trust purposes. Sovereign lands may only be used for purposes consistent with this public trust, which uses include commerce, navigation, fisheries, open space, wetlands and other related trust uses. The CSLC has an oversight responsibility for tide and submerged lands legislatively granted in trust to local jurisdictions (Public Resources Code § 6301).

Management responsibilities of the CSLC extend to activities within submerged lands and those within three nautical miles offshore. These activities include oil and gas developments; harbor development and management oversight; construction and operation of any offshore pipelines or other facilities; dredging; reclamation; use of filled sovereign lands; topographical and geological studies; and other activities which occur on these lands. The CSLC also surveys and maintains title records of all state sovereign lands as well as settling issues of title and jurisdiction.

Recreational activities at all proposed receiver sites include a variety of onshore and offshore activities, including walking/jogging, swimming, surfing, windsurfing, sunbathing, beach combing, fishing (both commercial and sportfishing), SCUBA and skin diving, hiking, picnicking, boating, sailing, and bicycling. Fishing includes commercial fishing, sport fishing, lobster fishing, and gillnetting. Some of the species most commonly caught in the region include white seabass, rockfish, shark, halibut, lobster, sea urchins, and abalone. Fishing can occur throughout the offshore area, although most of the activity concentrates around offshore kelp beds. The large majority of human activity occurs closer to shore that at the outer edge of the kelp beds. Near the proposed offshore borrow sites, whale watching is a popular recreational activity.

Carlsbad

The Carlsbad site is located on a low tide terrace, which lies in front of coastal cliffs between Agua Hedionda and Batiquitos Lagoon. The steep coastal cliffs in this area have been continually forming from wave action cutting against the marine terrace. This process has occurred since the last relative still-stand of sea level, approximately 6,000 years ago (FRH 1997). The existing site comprises the flat, rocky, shallow part of the shoreline and is part of the critical erosion area defined by CCSTWS.

The Carlsbad proposed site is under the jurisdiction of the California State Department of Parks and Recreation. An estimated 430,973 persons visited South Carlsbad State Beach in fiscal-year 1997-1998 (California Department of Parks and Recreation 1999). The South Carlsbad North receiver site is located approximately two miles north of the Batiquitos Lagoon inlet, stretching for approximately 2,800 feet (0.5 mile) to the north near Palomar Airport Road, under the

maximum length alternative. The site is bordered by steep vegetated bluffs. The Carlsbad site stretches for approximately 1,830 feet (0.3 mile) southward. Due to their location on a State Beach adjacent to the South Carlsbad State Beach Campground, the site is highly utilized for recreational purposes. The campground consists of 222 campsites, a lifeguard tower, park ranger facilities, and maintenance facilities. Beach surf breaks are scattered along the shore in the vicinity of the receiver site. No nearshore reefs supporting surf breaks are located within the immediate vicinity of these receiver sites. Surfing conditions in this area are primarily dependent upon shifting formations of nearshore sandbars. Adjacent land use includes several new residential and mixed use development projects currently being constructed along Coast Highway 101. The CSLC has jurisdiction over sovereign land. Authorization from the CSLC would be required for implementation of the proposed action.

Land Use Policies

The Carlsbad site is located within the Coastal Zone as designated in the City of Carlsbad General Plan (1994). For relevant plans and policies under the City's Land Use Element and LCP, refer to the discussion above under the North Carlsbad subheading. The receiver sites are also subject to the plans and policies identified in the San Diego Coastal State Park System General Plan, Volume 3: South Carlsbad State Beach (1984). This plan identifies proposed improvements to South Carlsbad State Beach facilities and policies intended to protect natural resources in the vicinity of the State Beach. The following policy is relevant to the proposed action:

> *Littoral sand loss is recognized as a major threat to existing facilities and recreational resources. The department shall work with other agencies, including the California Department of Boating and Waterways, the City of Carlsbad, the San Diego Association of Governments, and the U.S. Army Corps of Engineers, to develop regional solutions to the sand loss problem. Any major program of sand replenishment or retention must consider the regional nature of the problem and the regional impact of actions taken along a segment of the shoreline.*

Encinitas

The Moonlight Beach site was formed from sand and rocks that originated from upland erosion. The receiver site consists of a relatively thin sand layer, which varies in width and lies on a shallow rock platform. The receiver site is relatively wide although beach widths decrease to the north and south, where coastal bluffs line the coast.

The Moonlight Beach site is located within the Oceanside Littoral Cell and is subject to unusually large waves that can expose the rock layer by moving the sand offshore or down coast. The site is relatively wide although beach widths decrease south as the wave sheltering effect from Oceanside Harbor no longer plays a role. Beach widths south of Oceanside Harbor, however, are presently narrower than they were historically due to the net decrease of river sand inputs and the effect of the harbor, which prevents transport of sand from north to south. The Moonlight receiver site is located within a critical erosional area (USACOE 1991).

The proposed Moonlight Beach receiver site is located at the foot of Encinitas Boulevard at Moonlight State Beach. The proposed site is approximately 770 feet long (0.1 mile). Moonlight State Beach is a unit of the state park system, but is operated by the City of Encinitas. The state

beach is subject to the San Diego Coastal State Park System General Plan. In the fiscal year 1997-1998, there were 857,735 visitors to Moonlight State Beach (California Department of Parks and Recreation 1999). Facilities at Moonlight State Beach include two lifeguard towers, volleyball and tennis courts, picnic facilities, recreational equipment rentals and a snack bar. The southern part of the site abuts the Encinitas City Marine Life Refuge (California Fish and Game Code § 10913). Within Refuge boundaries, it is illegal to take invertebrates or marine life specimens except under a permit. Kelp harvesting, for recreational or commercial use, is prohibited except under a permit. Residential uses occur adjacent to the site, to the north and south. The beach area is relatively flat, but quickly slopes up to the east, north, and south. Public access is found at Moonlight State Beach and south at the D Street stairway. Popular surf breaks along this stretch are primarily a result of beach access points (due to difficulty in access along the southern segment along the steep coastal cliffs). Moving south from G Street, the surf breaks are more heavily influenced by reefs. Wave peaks are formed from reefs located within the surf zone. Boneyards and Swami's are examples of reef surf breaks south of the Moonlight receiver site.

Land Use Policies

All four Encinitas sites are located within the Coastal Zone as designated in the City of Encinitas General Plan (1989). Any project within the Coastal Zone is subject to review by the City of Encinitas and the CCC. Public beaches in the City of Encinitas are designated as Ecological Resource/Open Space/Parks in the City's General Plan (1989). The Leucadia and Moonlight beach sites are also within the Coastal Bluff Overlay zone.

The Encinitas General Plan identifies issues and opportunities relative to planning decisions within the City. Regarding beaches, the plan states, "the beach areas are losing sand depth each year and sand replenishment programs are needed to provide for their restoration." Additionally, the Resource Management Element of the General Plan identifies the following policies relevant to the proposed action:

> *8.6 The City will encourage measures which would replenish sandy beaches in order to protect coastal bluffs from wave action and maintain beach recreational resources. The City shall consider the needs of surf-related recreational activities prior to implementation of such measures.*
> *10.3 The City shall explore the prevention of beach sand erosion. Beaches shall be artificially nourished with excavated sand whenever suitable material becomes available through excavation or dredging, in conjunction with the development of a consistent and approved project. The City shall obtain necessary permits to be able to utilize available beach replenishment sands (as necessary, permits from the Army Corps of Engineers, California Coastal Commission, Department of Fish and Game, USEPA, etc.).*

In compliance with the California Coastal Act of 1976, the City of Encinitas includes an LCP LUP in its General Plan. The LUP identifies policies and provisions that serve to apply the Coastal Act in the City. Leucadia, Moonlight, and Cardiff State Beaches, operated and maintained by the California State Department of Parks and Recreation, are subject to guidelines set forth in the San Diego Coastal State Park System General Plan (refer to the relevant land use policy described under South Carlsbad State Beach).

Solana Beach

The Solana Beach site consists of a low tide terrace, which lies in front of coastal cliffs south of San Elijo Lagoon. The steep coastal cliffs in this area have been continually forming from wave action cutting against the marine terrace. This process has occurred since the last relative still-stand of sea level, approximately 6,000 years ago (FRH 1997). The existing site comprises the flat, rocky, shallow part of the shoreline visible during low tide.

The Solana Beach site is within the Oceanside Littoral Cell and is subject to similar transport processes as described for Encinitas. However, this site is not located within the critical erosional area south of Oceanside Harbor (as identified by the CCSTWS).

On-site and Adjacent Land Use

The proposed receiver site in the City of Solana Beach is located just south of Fletcher Cove Beach Park (terminus of Plaza Drive) and extends approximately 1,800 feet (0.3 mile) south. Steep cliffs abut the receiver site and the area consists of a gently sloping sand beach with scattered rocks and cobbles. Fletcher Cove received 51,000 cy of sand from excavated fill in the spring of 1999 (Semple 1999). The fill was excavated in 1998 and 1999 as part of the nearby Lomas Santa Fe Drive railroad grade separation project. Residential development and some commercial uses exist above the receiver site along the bluff. The bluffs and beach are severely eroded, and numerous efforts to slow erosion, such as rip-rap, the filling in of sea caves, sea walls, and other revetments occur along the bluffs and beach. There is also a lifeguard station and public shower at Fletcher Cove.

A small subtidal reef exists north of Fletcher Cove, known as Pill Box. Surfing is a popular activity at this reef. Surfing is also popular farther south at Cherry Hill and north at Tabletops, where other subtidal reefs exist.

The proposed receiver beach is within the CCC's jurisdiction. Any decisions regarding activities on the beach would be subject to the Commission's review and approval.

Land Use Policies

The City of Solana Beach currently has no approved LCP. The City anticipates preparation of an LCP in 2000 (Mitchell 1999).

Ventura

Ventura Harbor provides important recreational resources for the regional and local area. The Ventura Harbor complex includes administration facilities, the marina center, a resort hotel, parking areas, boat ramps, a sport fishing center, a boat repair yard, restaurants, marina hardware, and a mobile home park. Its open water area, about 20 hectares (50 acres), provides for channels and turning basins. Mooring areas comprise an additional 28 hectares (70 acres). Approximately 1500 craft, including 10 sport fishing vessels and 73 commercial fishing vessels, are moored in Ventura Harbor. A commercial fish processing facility, offshore oil drilling support facility, the headquarters for the Channel Islands National Park, and two boat-launching ramps for public utilization are in or based at Ventura Harbor. The contractor's storage area has been used as a storage area in previous years, and has no other land use at this time.

McGrath Beach State Park, located immediately south of and adjacent to the Santa Clara River, has 174 campsites that attract approximately 144,000 visitors annually. Swimming is discouraged at the beach due to dangerous riptide and current conditions. A major attraction of this park is the expansive beach and the adjoining wildlife habitat found in the Santa Clara River Lagoon and McGrath Lake. The park is managed by the State of California, Department of Parks and Recreation.

South Beach is located immediately south of the Ventura Harbor entrance, extending downcoast to the mouth of the Santa Clara River. South Beach is owned by the State of California. Typical recreation activities include swimming, surfing, bodysurfing, sunbathing, surf fishing, bird watching, jogging, and picnicking. The beach is currently not maintained by any agency and no lifeguard service is provided. Signs are posted warning visitors of aquatic hazards, such as rip currents, but generally seem to have little deterrent effect on heavy use days. The estimated annual visitation at this beach is approximately 166,000.

VI. Noise Levels/Traffic/Transportation

Noise Levels

Noise (sound) is measured in units called decibels (dB). The dB level decreases with distance from the source, usually by a rate of 6 dB for every doubling of distance. Automobiles (including those on the Ventura Freeway), recreational boats and vehicles, and small commercial fishing boats are the major contributors to the ambient noise environment at Ventura Harbor and nearby beaches. Noise levels tend to increase during heavy summer recreational utilization (COE 1984, 1985, 1986, 1987).

The exterior noise level thresholds for commercial properties, such as the harbor, are 60 decibels (dB) from 7:00 a.m. to 10:00 p.m., and 55 dB from 10:00 p.m. to 7:00 a.m. In residential areas, the thresholds are reduced to 50 dB and 45 dB, respectively. Noise levels are measured at the receiving property. Louder sounds are acceptable for short periods of time, or if the ambient noise levels exceed the threshold limits. Noise generated from construction of structures, even within residential zones, is permitted between 7:00 a.m. and 8:00 p.m. (Noise Ordinance Section 6264.4). Trucks are not permitted to idle for more than five minutes in public rights-of-way or within 200 feet of a residential area, between 10:00 p.m. and 7:00 a.m. (Noise Ordinance Section 6264.63). Notwithstanding these and other Sections, the local noise ordinance states it is unlawful to make loud or unusual noises which disturb the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person.

TRAFFIC

This existing conditions section for traffic addresses receiver site access for the receiver sites. Vessel traffic is discussed in Sections 3.9 and 4.9 (Public Health and Safety) and in Section 2.4. Regional access to all receiver sites is provided via Interstate 5 (I-5). West of I-5, access is also provided via Coast Highway 101, which extends from Oceanside south to Del Mar. North Torrey Pines Road, Mission Boulevard, and Seacoast Drive provide access to the Torrey Pines, Mission

Beach, and Imperial Beach receiver sites, respectively. The principal access routes from I-5 for the 13 receiver sites are listed in Table 3.11-1 below.

Existing traffic on the beach access routes is often heavy, as most of the routes serve commercial, motel or camping, and residential uses as well as the beaches. Traffic is most congested on warm weekends, when residents from throughout the country and adjacent areas use the beaches. During these peak use periods, parking areas often are filled to capacity.

VII. Public Utilities and Structures

STRUCTURES AND UTILITIES

For the purpose of this EA, structures and utilities are defined as sewer outfalls, access stairs and ramps, storm drain pipes, sea walls, and lifeguard towers. The following section identifies the location of the existing structures and utilities within or adjacent to the receiver sites. The description of structures and utilities is based on limited field surveys and prior environmental documentation (Department of the Navy 1997a; 1997b). In addition, city personnel were contacted to determine the location of city sewer and storm drain ocean outfalls and any other related facilities that could be potentially impacted by implementation of the proposed action.

Carlsbad

Lifeguard Tower No. 13 is located on the bluff just south of Palomar Airport Road and is permanent. There are no structures or utilities located on the beach along this receiver site. One public access stairway is located in the vicinity of the proposed receiver site. The stairway is located across from Ponto Drive and has beach access from the State Park on top of the bluff. In addition, two lifeguard towers are located along the beach; approximately 30 yards north of the access staircase and 250 yards south of the access stairs. The towers are moved from the beach in late October to the jetty further north against the bluff, and replaced on the beach in March.

Moonlight Beach

One 36-inch, one 60-inch, and three 48-inch storm drain pipes are located at the end of B Street at Moonlight State Beach. The City of Encinitas has excavated several feet around the outlets to expose the pipes and allow proper drainage flow. A public stairway is located at D Street. Rip-rap exists at the base of the bluffs on the northern and southern boundaries of the receiver site. A permanent lifeguard stand is located at the south end of Moonlight Beach at C Street and a temporary tower is placed at the north end of the beach at B Street. Both are situated on the berm above the low tide beach, and neither tower is moved during the winter season.

Solana Beach

A 60-inch energy dissipator storm drain pipe is located at the west end of Plaza Street. Another storm drain outlet is located at Seascape Surf, to the south of Fletcher Cove. This storm drain emerges from the bluff face at approximately 9 to 10 feet above MSL. There is a public access staircase at Del Mar Shores Beach Park, and a public access ramp at Plaza Street at Fletcher Cove. In addition, private stairs extend to the beach from Seascape Surf. One temporary lifeguard tower is located within the proposed receiver site at the Seascape Surf access point. Another tower is located just north of the proposed site at Fletcher Cove. Both towers are

annually placed on the beach the weekend before Memorial Day and removed the weekend after Labor Day.

VIII. Recreation/Public Health and Safety

For purposes of this EIR/EA, public health and safety issues are defined as those that directly affect the continued ability to protect and preserve life and property at locations along the proposed receiver sites.

Lifeguard Services

At Solana Beach, the respective jurisdiction provides lifeguard services. At the eight state beaches, however, the California Department of Parks and Recreation provides lifeguard services. The lifeguards are responsible for all recreational safety measures along the beach. Safety measures include manned lifeguard towers and regular vehicle patrols during the summer months. Lifeguard towers are typically more heavily staffed on weekends during summer months.

Recreational Safety

Storm drain outfalls occasionally contribute to water pollution at the receiver sites, especially after rainy periods. Water pollution stemming from these outfalls has resulted in the periodic closing of the region's beaches, when water contact is not recommended. In the days after a rain period, tidal action and longshore currents disperse pollutants and the beaches are reopened for recreation.

Vessel Safety

Commercial boats, fishing boats, and recreational vessels currently traverse the overall project area along the San Diego region's coast. Most vessels operate out of Oceanside Harbor, Mission Bay, and San Diego Bay.

IX. Socioeconomics

Under NEPA "economic" and "social" effects are environmental consequences to be examined (40 C.F.R. § 1502.16 and 40 C.F.R. § 1508.8). Under CEQA, the focus of an EIR is primarily on potential changes to the "physical conditions" which includes land, air, water, flora, fauna, population, housing, noise, and objects of historic or aesthetic significance (Cal. Pub. Res. Code § 21060.5; Cal. Code Regs. Title 14 §15358(b) and § 15382). The proposed action would place sand on existing beaches where there are no structures, except lifeguard towers, and there would be no physical changes to population or housing.

In addition to examining potential social and economic impacts to local and regional populations as a whole, any NEPA document must consider the potential for disproportionate environmental impacts to minority or low-income populations, as well as potential disproportionate environmental health and safety risks to children, in order to comply with relevant federal Executive Orders.

The primary social and economic related focus of the proposed project, as stated in the Purpose and Need of this EA (Section 1.2), is straightforward. The placement of sand at these public beaches is intended to enhance a valuable public resource that serves local residents in a number of ways. These include enhancing recreational opportunities at the receiver sites and bolstering the beaches as an important element of San Diego's attraction as a tourist destination, thereby providing benefits to the entire regional economy.

In addition to local and regional demographic and income information, this section presents information on commercial fisheries, the local social and economic sector most likely to adversely impacted by the proposed project. During the NOP process, the California Lobster and Trap Fishermen's Association, the Sea Urchin Harvesters' Association, California, and the Urchin Procedures Marketing Association raised several concerns regarding sand placement and potential impacts to these commercial fishing resources. As part of this EA process, these groups were contacted for further input.

Socioeconomic Characteristics

In terms of the broad economic contribution of beaches to the economy as a whole, while the total value of the beaches to the local jurisdictions and the region is known to be substantial, the quantification of the value of this resource is not straightforward. One way to approach the problem of valuation of is to examine the estimated costs of continuing beach loss to the region. An earlier regional study (SANDAG 1993) places estimated annual costs (losses) of lost property and recreational benefits to the region at $52 million by 2010 and over $226 million by 2040.

To provide a localized socioeconomic context for the proposed project, the remainder of this section presents information on population and income in the project area. To meet the specific intent of Executive Order 12898 on Environmental Justice (59 Fed. Reg. 7629 (1994)), it is necessary to consider the minority and economic status of the population surrounding receiver beaches. To allow for a subsequent assessment of potential disproportionate impacts to minority populations and low-income populations it is necessary to compare the same type of demographic and income information for the local jurisdiction and larger region. Therefore, these data provide information on population, ethnicity, and median income for each of the receiver beaches compared to the local jurisdiction and the San Diego County region. (Housing and employment data, often presented in socioeconomic sections of NEPA documents, are not provided in this section as the proposed project is not considered likely to have any direct impact on either housing or employment in the immediate area. Potential positive benefits to employment as a result of enhanced recreational and tourism opportunities would likely be felt at a subregional or regional level.)

Census tracts are the standard localized units of analysis for these types of data. Census tract boundaries do not necessarily follow city boundaries. The data presented in this section for local jurisdictions and the region as a whole are from SANDAG Demographic and Economic Estimates Profiles which are derived from 1990 census data. Data for individual census tracts are directly from the 1990 Census (STF 3A).

Population/Ethnicity

The majority of the project census tracts area have a lower non-white population percentage than both the local jurisdiction and the County of San Diego as a whole. Although the nonwhite population within census tracts 173.04, 175, and 177 is larger than that within the cities of Solana Beach and Encinitas, respectively, the minority population is still far below that of San Diego County in general. Therefore, while there may be a higher non-white population within those isolated census tracts compared to adjacent areas, these concentrations remain below the average regional minority population. Expressed in terms of a total minority population, most of the census tracts contiguous with the sand replenishment project area have a lower total minority population percentage than their jurisdictional cities or the county as a whole. Thus, in comparison to the adjacent cities and the county, the census tracts contiguous with the project area cannot be considered a high minority population area.

Income

Six of the twelve census tracts contiguous with the project area have median household incomes greater than the median household income for the San Diego Region, although many of the median incomes within the census tract are less than those in the jurisdictional cities. The median incomes within the affected tracts are close to the county median incomes, with the exception of Imperial Beach.

Commercial Fisheries

San Diego County supports a substantial commercial fishing industry, and it is also center for sport and recreational fishing and diving activities. This section describes the commercial fishing activity specific to the project area. The information presented in this section has been gathered from the CDFG catch statistics, NMFS, San Diego Unified Port District (SDUPD) and through meetings and interviews with local individuals involved with the industry.

Regional Overview

Several species of invertebrates and fish found in the project area are economically valuable marine resources, and the commercial fishery has been well established in the local economy for decades. The composition, volume, and the value of the local commercial catch have not been stable over time, however, as measured by a number of indices.

In terms of number of participants, statewide the number of licensed commercial fisherman since 1980 has declined by about 50 percent and roughly 70 percent since the late 1970s (SDUPD 1998). The data are incomplete for San Diego but it is assumed that this area has paralleled the statewide decline. The number of fishing vessels has shown a similar decline, and the San Diego fleet has decline by about 67 percent since the mid 1970s. The Port of San Diego, Mission Bay, and Oceanside Harbor are the base for nearly all commercial operations in the county.

The composition and relative economic importance of the local fishery has changed as well, with the largest changes being attributable to the local decline of the tuna fishery. In 1950, the San Diego county area produced the second largest volume and value of commercial fish landings among California's six primary fisheries statistical areas, accounting for 25 percent and 35 percent of the state's total commercial fishing landing volume and value respectively. By 1990, however, the San Diego county statistical area had dropped to being the state's lowest producer, with only one percent and four percent of the California's landings volume and value

respectively. By 1996, area landings had declined to three percent of the state's total value of landings. The role of tuna in these large scale changes can be seen by the fact that in 1980, various species of tuna comprised 96 percent of San Diego's volume and value of landings. By 1990, this figure had dropped to less than one percent of volume and value of local landings.

In general, over the past 25 years, the California fishing industry was harvesting less catch, required fewer fisherman, and utilized a smaller fleet in both boat length and numbers to bring the catch to port. Locally, since 1985, exclusive of tuna, while the number of fisherman and boats has declined significantly, the value of the landings have only declined slightly (SDUPD 1998). Commercial harvest and value of nearshore species showed a generally increasing trend from 1987 to 1995/1996, but since then has been declining. Annual commercial fishery catch and landings in volume (pounds) and value (dollars) are compiled by the CDFG. Landings are reported by area and port, and catch data are reported by fish block. Fish blocks are statistical areas normally 10 minutes of longitude by 10 minutes of latitude, with blocks adjacent to shore being somewhat smaller, with the area of specific blocks being determined by how the shoreline intersects the block area.

The relevant fish block and its corresponding shoreline within the project is 821 (Encinitas). All fishing gear types are combined and include hook and line, longline, troll, harpoon, trap, seine, and trawl. Assignation of a species to a specific block is not always completely accurate, and fluctuations in annual catches are significant. Determining the cause of these fluctuations can be difficult due to the complex set of variables that affect fish movements and abundance.

San Diego Area Overall Commercial Fishing Catch Volume and Value

San Diego area port landings for the five-year period 1994 through 1998 (inclusive) had a total dollar value over $16.2 million and totaled 17 million pounds for the data blocks analyzed (Table 3.8-10). This dollar amount was an ex-vessel value (e.g., whole fish, wholesale price), whereas the final economic contribution may be estimated to have been three to four times higher.

Lobster was the highest ranked commercial species in San Diego, representing 42.7 percent of the 1994 to 1998 dollar value of all species. Five-year totals were $6.9 million for a total of 1 million pounds. The majority of the catch (76 percent) came from the Point Loma and La Jolla areas. Approximately 13 percent of the catch came from the Encinitas to Solana Beach fish block, 8 percent from the Oceanside block, 3 percent from the Del Mar to Torrey Pines block, and 0.2 percent from the Imperial Beach block.

Urchin dollar value was ranked second at $5.6 million, and urchin poundage was ranked second at 5.3 million pounds. The dollar value for urchin represents 34.8 percent of the total of all species. Nearly 99 percent of the urchin catch was from the La Jolla to Point Loma fish block. Crabs were the third ranked taxa by dollar, with 479,000 pounds worth approximately $489,000 (3.0 percent of the total dollar value).
Mackerel and sardine were the first and third ranked catches by weight, at 6.4 and 1.4 million pounds, respectively. The relatively low value per pound for these two species placed them fourth and thirteenth by dollar value, respectively. California halibut, swordfish, rockfish, prawn/shrimp, and tuna all supported local fisheries, with five-year dollar values ranging from

approximately $257,000 to $379,000. Shark and croaker had the next highest commercial value with five-year dollar values near $149,000. The 12 species/categories listed above had a combined dollar value of $15.4 million, which is 95 percent of the total $16.2 million for all commercial fish species (Table 3.8-10) listed for these blocks, which include both nearshore and offshore species.

San Diego Commercial Fishing Catch Volume and Value for Nearshore Species

In order to provide a more specific analysis of commercial landings for species that might be impacted by the proposed project, and because commercial catch and value can change dramatically from year-to-year, a longer-term perspective of nearshore commercial fishing is more appropriate for analysis. Only those species generally fished in nearshore waters were considered for further discussion. The exceptions are spot and ridgeback prawns because of concern expressed by commercial fisherman that nearshore waters may be important as nursery areas.

The total value of San Diego County commercial landings from 1981 to 1998 for the selected nearshore species was $31.2 million (Table 3.8-11), or an annual average of $1.7 million. This dollar amount is ex-vessel value (e.g., whole fish, wholesale price), and the final economic value is about three to four times higher. Commercial landings at Oceanside represent 10.3 percent of the total San Diego County nearshore landings. The commercial catch and value changes significantly from year to year. The value of landings for the nearshore species for San Diego County in 1998 was $1.3 million (Port of San Diego plus Oceanside) with Oceanside representing 10.0 percent of the total. This is in sharp contrast to 1997 when the total landings were $3.2 million with Oceanside accounting for 16.6 percent of that figure. It should be noted that unlike fish block harvest data, the commercial port landing data of nearshore species for San Diego County does include catch from the Channel Islands as well as from areas along the mainland. The proportion of catch attributable to areas other than San Diego County coastline cannot be determined from available records.

For the San Diego area as a whole, California lobster ranked first in value ($14.1 million) of landings followed closely by red urchin ($11.6 million) (Table 3.8-11). These two species accounted for over 80 percent of the total nearshore commercial catch. Lobster accounted for 68.0 percent of the catch at Oceanside. Landings of red urchins at Oceanside only account for 2.2 percent of the commercial value. Lobster accounted for 42.5 percent of the value of the total catch at the San Diego port, and lobster and combined red urchin accounted for 83.7 percent of the value of the total catch. Thus, lobster landings at Oceanside were by far the most valuable resource for local fisherman while lobster and red urchin are about equal for the San Diego area. It is important to note how relatively large the lobster and urchin fisheries are in relation to other San Diego area fisheries. As shown in Table 3.8-11, lobster and urchins were the only species whose ex-vessel value was in excess of $10 million over the period 1981-1998. The next most valuable species for the same period was well under $2 million.
Other important commercial species for San Diego County include rock crabs (various species of *Cancer* spp.) which ranked third in value ($1.6 million), California halibut which ranked 4th ($1.4 million), and abalone (all species of *Haliotis spp.*) ranked 5th ($1.0 million). Few red urchins are landed at Oceanside, so rock crab and halibut ranked second and third in value at this port,

respectively. These three species were the only species whose local landing value was in excess of $1 million each (but less than $10 million) over the period 1981-1998.

Some species historically had low value and were not commercially exploited in even the recent past (Figure 3.8-2). However, with the advent of the live trap market for California sheephead and spot prawn, the value and importance of these resources has increased. Averaged over the last 18 years these species ranked 6th and 7th, respectively, and in 1998 sheephead and spot prawn represented 4.4 percent and 2.2 percent of the nearshore San Diego County commercial catch. These two species, with values of approximately $660,000 and $640,000 are the only species valued above $40,000 (but less than $1 million).

Other resources of lesser value include sea cucumber (*Parastichopus* spp.), ridgeback prawn, California moray eel, shrimp, purple urchin, and octopus. The combined value of these latter species represents only 0.36 percent of the total value from 1981 to 1998 and only 1.3 percent of the value for total landings for 1998.

For all nearshore species of commercial importance, volume and value have fluctuated significantly both in absolute and relative terms over the period 1981-1998, as shown in Figure 3.8-2. Perhaps the most obvious trend has been the decline and subsequent closure of harvesting abalone. In the early 1980's, abalone ranked third in importance behind lobster and red urchin. However, abalone harvest has declined significantly for multiple reasons and at the present time there is a moratorium on the harvesting of abalone south of San Francisco. Furthermore, the white and black abalone are candidate species for listing as an endangered species.

Other important trends include the variability and value of the lobster catch which declined significantly in the late 1980's following the 1983/1984 El Niño event and has shown an increasing trend until 1997, which was the best year on record. Lobster catch declined significantly following the El Niño of 1997/1998. The pattern of lower lobster catch following El Niño has been observed before by commercial fisherman, but the magnitude of decreases varied by location (Guth 1999). As shown in Figure 3.8-1, the value of lobster in 1998 dropped to approximately one-quarter of its 1997 value in the Oceanside/North County port area and to approximately one-half of its 1997 value in the San Diego port area.

Poundage and value of the red urchin catch has also shown extreme fluctuation. This resource also showed a decline in the late 1980s, followed by increases in the early 1990s, and then a leveling off followed by a significant decline for 1997 and 1998 (Figure 3.8-2). A similar pattern is seen for rock crabs. Because of the complexity of the natural environment and species life histories, causes for annual changes in abundance of species are often not known and are difficult to determine. However, El Niño events significantly affect the physical environment (e.g., temperature, nutrients) which directly affects the success and survival of commercially important species. Equally important are the indirect effects caused by El Niño; e.g., the loss of most kelp beds and the food and shelter these habitats provide. Red urchins may well survive El Niño events but with a significant loss of kelp they have little food available and thus are not capable of producing roe, which is the target of the commercial harvest. Thus, red urchin harvest declines following El Niño events are more due to kelp loss and poor condition of the urchins,

and not necessarily because the urchins are directly affected by El Niño or have been overharvested.

Finfish catch and values have also shown considerable variability over the period. California halibut catch has shown considerable annual variation, but was greatest in the mid 1980s (Figure 3.8-2). By 1998, halibut represented only 3.8 percent of the total value for all the nearshore species. The live trap fishery for the California sheephead is relatively new, becoming important around 1992. Similarly, the live trap fishing for the spot prawn has become an important resource with 1993 representing a peak year for the value of this resource. Sea cucumbers appear to have become a commercially important fishery beginning around 1993.

It is important to note that harvest of all target resources declined in 1998 following the most recent El Niño (Figure 3.8-2). A similar decline for most species also occurred following the 1983/1984 El Niño (Figure 3.8-2).

Economic Importance of Nearshore Species by Fish Block

Table 3.8-12 provides a breakout of ex-vessel value of most valuable nearshore species for the relevant fish blocks for the period 1987-1998 to facilitate comparisons by block. Clearly lobster and red urchin are the most valuable in terms of dollar amount.

In terms of geographic distribution of valuable nearshore species, several important facts are evident in Table 3.8-12. First, the overall importance of fish block 860, La Jolla to Point Loma, must be highlighted. This block accounts for 85 percent of the total value for the species and area listed. Second, lobster and red urchins are each worth more than 14 times as much as the next most valuable species. Third, within the two most valuable species, a very different geographic distribution pattern is found. For urchins, fully 99 percent of the value of the local fishery is concentrated in fish block 860, stretching from La Jolla to Point Loma. For lobsters, the La Jolla to Point Loma area dominates the value of catch as well, but not as strongly. Seventy-seven percent of the value is concentrated in this block ($7.5 million), but the value of lobster from the Oceanside ($0.8 million) and Encinitas/Solana Beach ($1.1 million) blocks are each worth more than any other species (except urchins) for the entire five-block region combined. Each is also worth in excess of 19 times the value of urchins from any one block in the region, aside from the La Jolla/Point Loma block. The Del Mar/Torrey Pines block, with a lobster value of $353,000 comprises a relatively small portion (four percent) of the regional lobster catch, however this value is still well in excess (by a factor of two or more) of the value of any other single commercial nearshore species for any individual block outside of block 860.

Looking at the next tier species by value in Table 3.8-12, there are three nearshore species currently being fished that have an aggregate value in the $600,000 to $700,000 range. Approximately 78 percent of the combined value of these species is concentrated in the La Jolla/Point Loma fish block (slightly over $1.5 million out of just under $2.0 million total value). The pattern of distribution of catch is different for rock crab, however, than for halibut and sheephead. Halibut and sheephead are more heavily concentrated (88 percent and 86 percent of total area species value, respectively) in the La Jolla/Point Loma area. Rock crab catch, on the other hand, is less concentrated. While La Jolla/Point Loma still account for 61 percent

of the catch, Oceanside accounts for 24 percent of the area catch, and Imperial Beach comprises nine percent of the catch. Oceanside is thus a relatively important area for the rock crab fishery, and rock crab is by far the most valuable nearshore species in the Imperial Beach fish block (69 percent of total value of nearshore catch from that block).

Nearshore Species Habitat Range and Fishing Techniques

The following sections provide additional information about the lifecycle and typical fishery operations for lobster and red sea urchin. Specific biological life cycle data on these species may be found in Appendix D. Appendix D also contains similar information for rock crab, halibut, abalone, sheephead, spot prawn, and ridge back prawn.

California Spiny Lobster (*Panulirus interruptus*), the commercial species of greatest value locally, is found from Monterey Bay to Manzanillo, Mexico, mostly from Point Conception to Magdalena Bay, Baja California. Adult lobsters are typically found in rocky areas from the intertidal zone to at least 240 feet. Local fishermen note that there is marked movement of adults between inshore and offshore areas. Most of the fishing for this species occurs in rocky coastal areas up to 120 feet in depth, although lobsters have been caught on any type of substrate. Traps are set on all bottom types from sand to rocky substrate. Ninety percent of commercial trapping takes place in depths of 90 feet or less (CDFG 1993), with most traps set at depths of 10 to 50 feet, according to local fishermen. The fishing season extends from October to March.

Lobster are commercially fished locally via baited traps set from small boats that range from 20 to 45 feet in length, with the typical vessels in the 25 to 35 foot range. Smaller vessels may work the season with a single fisherman, while larger vessels may start the season with a skipper and two crew, but then reduce to one crew member as the catch drops off. The basis for crew compensation apparently varies from operation to operation, with some based on various types of the more traditional ‘share’ calculations, while others have moved toward flat rates.

As noted in earlier sections, the area of highest concentration for lobster fishing occurs in the La Jolla to Point Loma area, but vessels from Mission Bay to Oceanside can and do fish the North County coast, according to interviews. Where a vessel is “homeported” is a trade-off between expense and convenience as, for example, fuel costs and slip fees tend to be less expensive at port facilities farther from local fishing grounds. Also according to interviews, vessels working the area may have several hundred traps per vessel, up to perhaps 600 to 700 traps per boat for the larger operations. As gear sets and hauls can be six days apart, it is not necessarily the largest vessels that work the greatest number of traps, as small vessel owners can increase their effective gear capacity by making more frequent sets. According to local fishermen, an estimated 10,000 to 12,000 traps are set during peak season (October through November), with progressively fewer traps set as the season continues past the peak.

The nature of the fishery has reportedly changed with the implementation of a limited entry regulatory system several years ago. Prior to limited entry, there were apparently a larger number of part-time lobster fishermen than is the case today. According to interviews, approximately one-half the fishermen who fish lobster do so exclusively, and do not switch to other species after the lobster harvest starts to decline or the season ends but, rather, discontinue fishing until

the next lobster season. Those who do keep fishing transition into a variety of other fisheries, including spot prawns, sheephead, rock crab, the live eel fishery, or gillnetting. While levels of dependency vary, lobster is clearly the central element of the typical year's economic base for participants, especially for the smaller boats that have less flexibility in their ability to change gear types and move between fisheries.

The market for locally caught lobster has varied considerably over the last few years. Lobster are not landed at central processing facilities, rather, both the fishermen and the buyers are mobile and sales can take place wherever appropriate harbor facilities are available. While a significant portion of the local catch reportedly goes to the local restaurant market, it is not uncommon for larger operations to sell catch to Los Angeles-based entities. Reportedly, a larger proportion of the catch was going to Far East until the recent Asian economic crisis; in the wake of that set of events fishermen have had to rebuild local market relationships.

Juvenile lobsters usually spend their first one to two years in nearshore surfgrass and eelgrass beds. Adults are found in rocky habitats, though they will move onto sand in search of food. It takes about seven to eleven years for lobsters to reach legal size. Fishermen expressed concerns about the impact that project related turbidity may have on these nursery areas and its effect on juvenile lobster. There are only few studies on the effects of turbidity and sand burial on juvenile lobsters (e.g., Engle 1979, Perry 1999). Perry's work in New Zealand on juvenile rock lobster found that they could survive suspended sediment of 363 mg/l for four days with no adverse effects. Juveniles of this species were also observed to bury with no apparent detrimental effect. Thus, juvenile rock lobster appear capable of tolerating high turbidity and suspended sediments. There may be benefits as well as high turbidity may reduce visual predation.

Cumulative ex-vessel dollar value for lobster from 1994-1998 comprised 42.7 percent of all commercial species landed in San Diego County (Table 3.8-10). Considering only nearshore commercial species since 1981, lobster ranked number one in value representing 45.2 percent of the value for all nearshore species landed (Table 3.8-11). In the North County areas, lobster represents 68 percent of the commercial catch landed at Oceanside. Considering only the North County area for most recent two years, 1997-1998, Encinitas to Solana Beach represented about 62 percent of the catch landed at Oceanside while Oceanside and Del Mar to Torrey Pines represents about 29 percent and 9 percent, respectively, a pattern somewhat different than that seen over the longer term, where the Oceanside area has normally played a much larger role in proportion of landings.

Red sea urchins (*Strongylocentrotus franciscanus*) are ranked number two value to local fishermen. Red and purple sea urchins are found from Alaska to Cedros Island in Baja California. They majority are found in rocky bottom habitats from the intertidal zone out to a depth of about 100 feet. According to local fishermen, urchins take three to five years to reach a commercially viable harvest size. Harvesting of red sea urchins can occur from 5 to 100 feet, but most of the catch is taken between 20 and 60 feet. According to fishermen contacted for this project, it is estimated that most of the local catch is taken between 10 and 50 feet, with a smaller amount harvested somewhat deeper. Urchins are reportedly fished locally anywhere between Oceanside and San Diego where there is a hard bottom, but kelp areas are considered the prime fishing locations.

Red urchins are generally landed at San Diego, a processing center, and generally not landed at Oceanside where there is no processing facility. In terms of harvest area, nearly 99 percent of the red urchins are caught in the La Jolla to Point Loma fish block. Urchin harvest is conducted by divers. Diving typically is done from small vessels (22 to 32 feet) with several divers generally using surface supplied air. Urchins are collected in net bags and hauled to the surface at regular intervals. According to local fishermen, at least some San Diego area based urchin divers harvest urchins from as far away as northern California.

Kelp Harvesting

Kelp harvesting operations also occur in the proposed project area. The giant kelp, *Macrocystis pyrifera*, is found all along the western coast of the United States. Off the Southern California coast, kelp is found on rocky substrate in wave-exposed areas at depths of 20 to 120 feet. Kelp harvesting has occurred in California since 1911 and involves the use of cutter barges which harvest the upper the kelp canopy down to a depth of about four feet below the water surface. Kelp beds are located near some of the borrow sites and beaches.

A number of factors can influence the vitality of kelp beds. Grazers such as the halfmoon, opaleye, perch, sea urchins, and various crustaceans can affect the growth of kelp. Storms frequently pull kelp plants off the substrate. Sedimentation of the rocky bottom has also been known to retard kelp growth and bury young plants, preventing development and reproduction. Kelp beds are leased and harvested by Kelco along the San Diego coast. Those beds located between Leucadia and Solana Beach are of prime concern for the project (Glantz 1999).

Recreational Fishing and Diving

A wide range of marine recreational fishing and diving opportunities exist along the San Diego coast. These include surf and shoreline fishing, pier fishing, party boat fishing, private boat fishing and diving and skin/SCUBA diving. National Marine Fisheries Service conducted a study (NMFS 1991) to determine the extent of recreational marine fishing in California and the economic impact of the activity. Data from telephone interviews of California Coastal County residents was assessed to estimate annual expenditures, locations and types of fishing methods, and target fish species. The total number of anglers utilizing San Diego County fisheries resources in 1989 was estimated at 159,600, with annual expenditures exceeding $82 million. Fishing from private and charter boats accounted for over $71 million of the total. Fishing from piers and beaches was a popular activity, with 350,900 and 119,800 trips per year, respectively. Annual expenditures for pier and beach fishing were $4.9 million and $5.8 million, respectively. The most common target species for beach fishing were bass, halibut, corbina, white seabass, perch, and croaker.

The sport party boat fishing fleet specializes in carrying fisherman to areas where fish can be caught and more recently for whale watching. Most of these charters target offshore and pelagic species especially tuna, yellowtail, albacore, and shark. However, there is a small contingent of operators that specialize is half and one-day charters that typically fish the nearshore areas and kelp beds. These operators target sand and kelp bass and California halibut. Oceanside harbor

has one to four boats that specialize in this fishery while Mission and San Diego Bays have a large charter fleet.

Sport diving and spearfishing activity mostly occur in the nearshore waters, and the number of diving trips in San Diego was about 30,000 per year (NMFS 1991). Most diving occurs in habitats rich in marine life, especially kelp beds and rocky reefs. Much of the diving in San Diego involves trips to locations not accessible other than by boat, including offshore kelp beds, the vessels intentionally sunk as artificial reefs in "Wreck Alley" off of Mission Beach, and even offshore islands and banks. Shoreline diving is also popular. Borrow site MB-1 is located inside the Wreck Alley area (refer to Section 3.6).

The most common local beach diving locations include the submarine canyon off La Jolla Shores (where dive instruction classes are typically taught), La Jolla Cove (due to the abundant undersea life there attributable in part to the area's protected underwater reserve status), and numerous other sites along the coast from La Jolla to Oceanside where public access to nearshore reefs is convenient. Photography, spearfishing for kelp bass and halibut, and diving for spiny lobsters are three of the more popular diving activities. Spearfishing can involve either skin diving (also known as snorkeling or free diving) or the SCUBA gear. Sport diving for lobster usually involves SCUBA diving as the lobster must be captured by hand without the use of snares or any other tools, and individual lobster are often found under reef ledges, in crevices between rocks, or in other difficult to access areas. Some lobster diving takes place at night, as lobsters are more likely to leave shelter to forage and are thus easier to capture by hand. Diving for fish and/or lobster occurred at a rate of about 1,000 trips per month, season permitting. The average number of divers varies according to season, weather, and sea conditions (NMFS 1991). In recent years, the popularity of non-consumptive sport dive activities have increased relative to dives oriented toward taking game.

X. Oceanography/Marine Water Quality

Littoral Transport

The beaches along the central and southern coasts of California are typically dynamic in nature, with constant and continual longshore and onshore/offshore sediment transport. These processes vary seasonally in intensity depending upon both local oceanographic and weather conditions and on conditions throughout the eastern Pacific Ocean. Particles of sediment moved via this erosional process are typically suspended into the water column by wave or current action, transported some distance by longshore currents, and then deposited on adjacent beaches. The void (or erosion) left behind by this movement is normally replenished by similar sediment that has been eroded from yet another beach area. Although giving the illusion of stationary beaches, actual sediment constituting beaches is in a state of constant movement.

When such material is transported past or into the protected low-energy waters of Ventura Harbor, however, suspended material settles, and is then only rarely resuspended. Therefore, Ventura Harbor, like other harbors, acts as an interceptor of this longshore transport of sediment that would otherwise continue upcoast or downcoast. Over time, this settling of material results in shoaling of navigation channels within the harbor, necessitating periodic

maintenance dredging to ensure safe navigation conditions. The quantity of material, and the periodicity and extent of maintenance dredging activities in Ventura Harbor, is dependent upon the highly variable local oceanographic conditions; and specifically on the frequency, intensity, and duration of longshore currents, wind, storms, and other wave actions.

Baseline water quality data collected annually in Ventura Harbor since 1993, by Applied Environmental Technologies (AET, Inc.) indicates relatively good ambient water quality. Dissolved oxygen measurements at monitoring stations taken during the November to December 1996 dredging episode ranged from 6.0 mg/liter to 14.3 mg/liter. These concentrations were well above the minimum 5.0 mg/liter required in the California Regional Water Quality Control Board-Waste Discharge Requirements (Order No. 87-25) for the Ventura Port District. The water in the harbor vicinity carries a fairly heavy sediment load from upstream beaches; however, most baseline studies indicated no discoloration or turbidity.

Urban and agricultural runoff into the Santa Clara River may carry low concentrations of pesticides, fertilizers, petroleum products and other pollutants into the Pacific Ocean a short distance downcoast from Ventura Harbor. Agriculture is declining and commercial development is minor in the project vicinity; therefore, pollution of water in the Ventura Harbor vicinity due to runoff is not significant. A City of Ventura wastewater treatment plant discharges treated effluent into the Santa Clara River. This effluent is in compliance with water quality standards and is not a significant source of water pollution. No major water quality problems are known or expected, in this area (McClelland, 1984, 1986, 1987; U.S. Army Corps of Engineers, 1983, 1987; U.S. Fish and Wildlife, 1984).

Physical Properties

The general oceanic circulation off the coast of California is dominated by the long-term mean southward flow associated with the California Current. In southern California, the current divides into a southward extension and a recirculating flow toward the coast. The recirculation forms a counterclockwise eddy that is present most of the year. An inshore countercurrent (Davidson Current) moves north from Baja California and is detected along the southern California coastline from October to April.

Currents move large amounts of water with varying levels of temperature, salinity, dissolved oxygen, and nutrients in and out of the study area. These water masses vary in strength and are influenced by weather patterns and seasonal variations. In addition, nearshore currents vary along the coast in response to coastline orientation, bottom topography, and tides. Kelp forests may slow ocean currents to one-third of the normal rate.

Waves (swell) also exert a significant influence upon the water column and nearshore bottom habitats. In shallow water, the circular motion within the water column can induce the resuspension and transport of bottom sediments. Wave height and high-velocity swell tend to be most prominent during winter and spring due to storms from the North Pacific.

All of southern California has a mixed semidiurnal (daily) tide with two high tides and two low tides, each of different magnitude, every 24 hours and 50 minutes. The range between mean high and low water is approximately 3.7 feet and the diurnal range is approximately 5.4 feet.
Local currents in nearshore waters are complex and include longshore currents, which flow parallel to the shore, and cross-shore and rip currents, which move in an onshore-offshore direction. The combination of these currents makes up the littoral transport process. Longshore currents in the coastal zone and driven primarily by waves striking the shoreline at oblique angles. Overall, longshore currents produce drift and sediment transport (turbidity) from north to south. Wave exposure affects the receiver beaches from the south and west.

Seasonal fluctuations in wave patterns and currents also cause substantial changes in water quality, especially turbidity. Warming by the sun is the primary factor that affects surface water temperatures in southern California from June to October.

Seasonal upwelling and downwelling also affect water quality within the area. Upwelling occurs when northern winds displace surface waters offshore, resulting in replacement by colder, deeper waters. These colder waters have lower dissolved oxygen, but they have higher salinity and, most importantly, are richer in nutrients. Upwelling is generally present from late March though July in the San Diego County area. Downwelling occurs when southern winds push offshore waters towards the shore, thus, pushing nearshore surface waters down and causing warmer waters and lower salinity than is typical for deeper waters.

Chemical Properties

The similarities and differences in chemical properties expected at the borrow sites and offshore the receiver sites are described below. The initial focus is factors associated with the water, specifically temperature, salinity, dissolved oxygen and pH. This is followed by sediment characteristics.

Temperature

In areas near the borrow sites, seasonal thermoclines stratify the water column. Waters typically are stratified during the summer and early fall, unstratified during the winter, and transitional (e.g., stratification weakening or increasing) in late fall and spring. Thermoclines represent barriers to mixing between surface and bottom waters. Surface water temperatures generally are highest from June through September and lowest from November through February. Temperatures near the bottom generally are higher from October through January and lower from April through June. Historical temperatures in the study area range from 52 to 74º F near the surface and from 49 to 61º F near the bottom.

Water temperatures near the receiver sites tend to be more uniform throughout the water column due to turbulent mixing and shallower depths. Nearshore locations are shallower and have slightly higher temperatures in the range of 57 to 75 °F.

Salinity

Historical salinity levels are fairly uniform ranging from approximately 32 to 34 parts per thousand (ppt) throughout the study area. Salinity levels tend to be homogenous throughout the water column with differences typically less than 1 ppt from surface (near receiver sites) to bottom waters (borrow sites). The exception is during winter storms when freshwater runoff reduces surface water salinity, especially at nearshore locations. Salinity levels in both surface and bottom waters may be slightly higher from April to August due to upwelling of more dense bottom waters.

Dissolved Oxygen

Historical dissolved oxygen values range from 5.0 to 11.6 mg/L throughout the study area. Surface and nearshore waters generally have higher concentrations of dissolved oxygen due to continuous wave action and atmospheric mixing. A dissolved oxygen level equal to or greater than 5 milligrams per liter (mg/l) has been recommended as a generalized standard of acceptable water quality for aquatic life. Dissolved oxygen concentrations are routinely measured off the coast of Encinitas. Average recorded dissolved oxygen levels at that location are 6 to 10 mg/l.

pH

Historical pH values range from 7.7 to 8.4 throughout the study area. Slightly higher pH values occur during May through September when water temperatures are warmer. Little variance occurs from surface to bottom waters.

Turbidity

Turbidity is a result of particles suspended in the water column. Turbidity may result from natural causes, e.g., plankton concentrations, as well as from sediment particles suspended by waves, river discharge and/or dredging activities. Increases in turbidity can affect light levels in the water which can reduce photosynthesis and plant growth. Additional effects of turbidity may result in impaired feeding and respiration of fish and invertebrates.

Suspended silt particles in the water column will increase turbidity; however, larger sand particles (greater than 63 microns [µm]) will settle out rapidly and do not cause a significant increase in turbidity. Sampling of the water near the receiver beaches indicates that nearshore water visibility typically ranges between 5 and 20 feet; however, visibility is significantly reduced in the surf zone due to sediment disturbance from wave action and rip currents. Sediment testing has shown that the average percentage of fines in the Oceanside Littoral Cell native sediments is approximately three percent above mean sea level (MSL) and 12 percent below MSL. The higher percentage of fines below MSL is attributed to the fact that finer grained materials reside at equilibrium below the shorebase. Generally, intertidal waters of the receiver beaches are characteristically turbid due to the high energy activity in the nearshore environment.

Water clarity for light (transmissivity) tends to increase with distance from shore. Transmissivity levels typically range from 40 to 90 percent at depths of the borrow sites in the study area. In the June 1999 survey of proposed borrow sites SO-5 and SO-7, surface water transmissivity ranged from 83.9 percent to 84.3 percent and bottom water transmissivity ranged from 64 percent to 69.6 percent.

Turbidity concentrations may be substantially elevated in coastal lagoons due to shallow depths, river discharges, storm runoff, and/or algal blooms. Suspended particle concentrations of 100 mg/l were recorded just inside Batiquitos Lagoon at the same time concentrations of 20 mg/l were recorded in the adjacent nearshore during a non-storm period.

Sediment Characteristics

Trace metal and organic contaminants discharged into coastal waters can settle to the bottom. Finer sediments (silts and clays) generally have higher contaminant concentrations than coarser sediments (sands). Contaminants may be remobilized through strong currents, storms, or mechanical disturbance such as dredging. Thus, grain size characteristics and sediment contaminant concentrations at the borrow sites are important to the evaluation of the potential for contaminant release and turbidity during dredging.